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ROYAL BOTANIC GARDENS, KEW.

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OF

MISCELLANEOUS INFORMATION.

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XIV.—NEW SPECIES OF MASDEVALLIA AND ALLIED GENERA.

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From Kew I received a very valuable collection of Masdevallias for examination and comparison with the older types of Reichenbach which are now in Vienna. The species were formerly examined and partly determined by the late Mr. R. A. Rolfe, with whom I can agree in the majority of determinations.

On the continent the two most complete collections of Lehmann's plants are those in the Herbaria of Vienna and Geneva. Both of these I have examined—those from Geneva being forwarded to me through the kindness of Prof. Chodat. There are however about twenty specimens amongst the Kew *Indeterminatae* which are not represented in either of these herbaria. In this paper I publish the descriptions of the new species.

As regards the sections of *Masdevallia* I have abstained deliberately from using the old names. Reichenbach, the author of them, never condescended to define his so-called " sections " and hence all the names occurring here and there in his papers are *nomina nuda* in the fullest meaning of the term. Not a few of them are wrong, and some are by no means appropriate, hence one cannot be expected to use them provided better ones can be supplied.

To go into this very entangled matter a very long discussion would be necessary and demand a larger space than I can claim in this paper. I refrain from it the more as I shall publish a complete monograph of the genus *Masdevallia* and the allied genera this year. In the preface there, I hope to elaborate my points as to the reasons for a new subdivision of the main genus, and there all the species now published will be arranged in their correct places in well-determined sections.

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1. **Masdevallia spathulifolia** *Kraenzl.* n. sp.; affinis *M. tridenti* Reichb. f. sed major, differt floribus albidis purpureo-maculatis, sepalo dorsali ecarinato.

Species epiphytica et terrestris; caespites parvi, leviter ascendentes. *Caules* dense aggregati, ad 3 cm. longi, cataphyllis aequilongis, oblique retusis tunicati. *Folia* spathulata, e petiolo quam lamina plerumque longiore sensim dilatata, petioli ad 12 cm. laminae ad 8 cm. longae, 1·5 ad ultra 2 cm. latae, carnosulae, virides. *Scapus* ad 36 cm. altus, subflexuosus, omnino nudus, apice pauciflorus (7–8–florus), floribus satis distantibus, *bracteae* late ovatae, acutae, 5 mm. longae et basi latae, *ovaria* brevissima, costis valde undulatis praedita superantes. *Cupula sepalorum* ampla, inflata, alte connata, sepalum dorsale non carinatum, caudae sepalorum parti connatae subaequilongae, circiter 9 ad 10 mm. longae, flores 2 cm. vix aequantes. *Petala* e basi tenui cuneatim dilatata, apice tridentata, apice mediano longius producto, tenuissimo, margine petalorum infra apicem grosse dentato, 3·5 mm. longa. *Labelli* pars basilaris late oblonga, pars antica vix sejuncta, illi anteposita, obtusa, totum 5 mm. longum, 2 mm. latum, discus a basi apicem usque lamellis 2 parum elevatis percursus. *Gynostemium* sectionis, leviter excavatum. *Flores* extus et intus glabri, lactei, elegantissime violaceo-punctati, caudae luteae.

Ecuador. Western slopes of Corazon; 2500–3000 m., *Lehmann* 7017 ! (Herb. Kew), 227 ! (Herb. Vindob.)—Fl. Oct.–Jan.

This is the tallest species of the whole section and, as far as I can judge from dried material, the most showy, the flowers being the largest of all. The characters pointed out in the diagnosis, especially the petals, place it in the affinity of *M. tridens* Reichb. f. but this species is much smaller in all its parts and has pale yellowish-brown flowers without the spots so characteristic of the section. The petioles nearly always exceed the length of the blade; this is also a character of value in this section.

2. **Masdevallia sphenopetala** *Kraenzl.* n. sp.; proxima videtur *M. bulbophyllopsidi* Kraenzl. a qua recedit statura majore, bracteis parvis, labello in semicirculum curvato, petalis retusis, antice valde dilatatis.

Caespites parvi. *Caules* circiter 1 cm. longi, cataphyllis amplis tunicati. *Folia* magnitudine valde diversa, cum petiolis 2·5 vel 4 vel 6 cm. longa, petiolis plerumque brevibus in laminas lanceolatas vel lineares, obtuse acutatas dilatatis, 4 ad 6 mm. lata. *Scapi* folia subduplo superantes, cum racemo ad 10 cm. alti, pauciflori, secundiflori, nudi. *Bracteae* late ovatae, breves, pedicellos et ovaria brevia, alte costata, 3·5 ad 5 mm. longa aequantes. *Cupula sepalorum* subglobosa, satis alte connata, partes liberae triangulae, in caudas parti clausae aequilongas,

teretes attenuatae, cum caudis recurvis, divergentibus ad 8 mm. longae, cupula intus glabra, mentum semiglobosum. *Petala* e basi paululo latiore angustata, deinde sensim cuneatim dilatata, antice retusa, minutissime denticulata, cum apice mediano, brevissimo, vix producto, vix 1·5 mm. longa, linea incrassata percursa. *Labellum* in semicirculum curvatum, complicatum, vi expansum antice minutissime apiculatum, margine denticulatum, petalis aequilongum. *Flores* sicci concolores, flavi, de colore vivorum nil dicit collector.

Ecuador. Eastern slopes of Corazon : forests of Silanti ; 2000–2300 m., *Lehmann* 6744 ! (Herb. Kew.)—Fl. Mar.-July.

A small indifferent looking species without beauty and also of no systematic or morphological interest. The discrepancies in the structure of the petals and lip are sufficient to establish a new species and to increase the cumbrous number of them by one more.

3. **Masdevallia Carruthersiana** *F. C. Lehm.* in sched. ; a *M. aristata* Barb. Rodr. cui ceterum similis, pedunculis folia duplo superantibus, mento vix evoluto, caudis brevioribus, labello diversa.

Planta epiphytica ? *Radices* tenues, copiosae, caespites parvi. *Caules* breves, vix ulli. *Folia* glauca, e petiolo 4 ad 5 cm. longo sensim in laminam oblanceolatam, breviter acutatam, triapiculatam (apiculo mediano longiore), satis robustam, 10 ad 12 cm. longam, 2 ad 2·5 cm. latam dilatata. *Scapi* circiter 30 cm. alti, triquetri, nudi, apice tantum floriferi, flores ad 7 succedanei, congesti, *bracteae* in fila dissolutae, *ovaria* triquetra, costae per paria approximatae, leviter undulatae, 4 ad 5 mm. longae. *Cupulae sepalorum* pars clausa 4 mm. longa, *sepalum dorsale* brevissimum, triangulum, subito in caudam, tenuissimam, 2·5 cm. longam attenuatum, *sepala lateralia* multo majora, 1·8 cm. longa, 5 mm. lata, oblonga, ex apice triangulo in caudam 1·8 cm. longam attenuata, omnia fusco-purpurea, caudae luteae, mentum sepalorum omnino nullum. *Petala* toto ambitu lanceolata, acuta, antice paulum supra basin dente rotundato praedita, linea mediana valde incrassata apicem usque percursa, 5 mm. longa. *Labellum* valde curvatum, hypochilio obcordato, utrinque rotundato et epichilio ovato-triangulo, longe acutato, antice papilloso compositum, cum carinulis 2 elevatulis per totum fere discum, petalis aequilongum (extensum scil.), ut videtur fuscum. *Gynostemium* leviter curvatum, acutum, minutissime punctulatum.

Ecuador. Chiquinda : Eastern Andes of Sigsig ; 1600–1900 m., *Lehmann* 6530 ! (Herb. Kew.)—Fl. Apr., May, Oct.

In size, growth and even in colour very similar to *M. aristata* Barb. Rodr. of Brazil, but provided with a scape of nearly twice the length and very different in the petals and lip. A description of the species has not been published previously.

4. **Masdevallia palmensis** *Kraenzl.* n. sp.; differt a *M. Rolfeana* Kraenzl. perigonii phyllis angustioribus et labello pandurato.

Caespites ut videtur parvi, haud densi. *Caules* 1·5 ad 2 cm. longi, cataphyllis mox emarcidis tunicati. *Folia* e petiolis longiusculis sensim in laminas lanceolatas vel oblongo-lanceolatas dilatata, acuta, biapiculata, cum mucronulo interposito, petiolis inclusis 10 ad 13 cm. longa, 1·5 ad 2 cm. lata, tenui-coriacea. *Scapi* cum floribus paucis, succedaneis, congestis folia aequantes, *bracteae* scariosae, late oblongae, acutae, 8 mm. longae, pedicellos necnon ovaria rectangulariter geniculata, teretia aequantes. *Cupula sepalorum* pro flore brevis vel subnulla, *sepalum dorsale* oblongum, concavum, leviter carinatum 1·8 cm. longum, 8 ad 9 mm. latum, in caudam filiformem, ultra 3 cm. longam attenuatum, *sepala lateralia* basi brevi-connata, mentum satis conspicuum, saccatum formantia, multo angustiora, lineari-lanceolata, breviter acutata, 2·2 cm. longa, 4 ad 5 mm. lata, intus minutissime pilosa, in caudas tenuissimas, 3·5 cm. longas attenuata. *Petala* basi antice dilatata, fere triangula, deinde leviter contracta, denique oblonga, acuta, cum linea elevata vel lamellula pone marginem, 1 cm. longa, medio 4 mm. lata. *Labellum* toto ambitu panduratum, antice spathulato-rotundatum, obtusum, utrinque satis profunde emarginatum, 1 cm. longum, antice et basi 4 mm. latum cum lineis 3 per discum, quarum laterales breviores, omnes apice incrassatae. *Gynostemium* petalis aequilongum, latissime marginatum, fere cucullatum, androclinii margo altus, minute denticulatus. *Flores* sicci sordide purpurei, vivi ?

Colombia. Antioquia: on trees in dense forests around la Palma above Envigado; 2000–3000 m., *Lehmann* 4286 ! (Herb. Kew.)—Fl. Oct.

At first sight the plant suggests *Scaphosepalum swertiifolium*. The size of the leaves and of the flower-stalks being quite the same in both species, but the flowers are exactly those of a *Masdevallia* of the type of *M. picturata* Reichb. f.

5. **Masdevallia sarcophylla** *Kraenzl.* n. sp.; a *M. campyloglossa* Reichb. f. cui certe proxima, sepalis circiter semilatis, rectis (haud falcatulis), labello recto, breviore, apice non scaberulo diversa.

Caespites mediocres, densissimi. *Caules* circiter 1 cm. longi. *Folia* e petiolo circiter 3 cm. longo statu vivo nigricante, terete sensim in laminam aequilongam vel paulo longiorem dilatata, crassissima, carnosa, pallide viridi-lutea, margine revoluta, ad 5 mm. lata. *Scapi* (mihi non visi) complures, 3 vel ultra e vagina quaque orientes, tenues, quam folia breviores, 1-flori (haec ex collectore), *bracteae* mihi non visae. *Flores* parvi, viridi-luteo-albi, 8 mm. longi. *Sepala* triangula, acuta, ecaudata, apicibus incurvis, dorsale fere omnino liberum, lateralia falcatula, incurva, fere basin usque libera, mentum satis amplum, rotun-

datum formantia, basi ultra 3 mm. lata, dorsale 2 mm. latum. *Petala* tenuissima, linearia, subobliqua, in apicem valde acutatum asymmetrice producta, 5 mm. longa, 1 mm. lata, subpellucida. *Labellum* oblongum, acutum, anguste marginatum, apice ipso membranaceo, lineis 3 satis conspicuis per totam longitudinem percursum, linea intermedia cum macula minuta in tertia parte anteriore ante apicem (an fortuito ?) ad 7 mm. longum, ad 2·5 mm. latum. *Gynostemium* breve, pes valde curvatus.

Colombia. Highlands of Popayan : epiphytic in park-like woods on the border of the river Huangobio ; 1700–1800 m., *Lehmann* 10041 ! (Herb. Kew.)—very scarce ! Fl. May and Nov.

The materials of this rare plant are very limited and by no means satisfactory, so perhaps in the future the diagnosis may be improved in some small points. The principal characters are, I hope, sufficiently pointed out. The unusual thickness of the leaves can be ascertained even in a dried state. The flower stalks are wanting, but the collector says they are shorter than the leaves. It is very difficult to discover its affinity with other species. There is a little blotch on the anterior part of the lip, but as I had only a single flower for examination I am unable to say if this is a character on which to trust.

6. **Masdevallia schizopetala** *Kraenzl.* n. sp. ; differt a *M. striatella* Reichb. f. cui habitu simillima petalis antice tridentatis labelloque (etsi imperfecte) trilobo.

Caespites mediocres, densi. *Caules* vix 1 cm. longi, cataphyllis-emarcidis tunicati. *Folia* crasse carnosa, firma, intense viridia, petioli vivi nigricantes (sicci griseo-virides) 2 ad 2·5 cm. longi, sensim in laminas anguste lanceolatas, obtusas, manifeste triapiculatas, 3·5 ad 4 cm. longas, 4 ad 5 mm. latas, dilatata. *Scapi* complures ex una eademque vagina succedanei, 1–flori, folia subaequantes, tenues, leviter flexi, nudi, *bractea* parva, pedicellum longiusculum longe non aequans, 3·5–4 mm. longa, pedicellus cum ovario 1 cm. longus, costae ovarii valde prosilientes. *Cupula sepalorum* angusta, compressa, pars clausa 5 mm. longa, *sepalum dorsale* mox liberum, ovatum, in caudam linearem, aequi-longam attenuatum, cum cauda 1·8 cm. longum, *sepala lateralia* longius connata, ceterum vix diversa, cum caudis subbrevioribus dorsali aequi-longa, caudae subparallelae, non divergentes, sepala pallide lutea cum lineis ternis brunneis, mentum vix prominulum rectangulum. *Petala* toto ambitu potissimum lanceolato– vel oblongo–rhombea describenda, in margine postico leviter curvata, in margine antico paulum infra medium acutangula, angulo brevi, tota circumferentia levissime curvata, apice in dentes 3, quorum intermedius longior, fissa, nervo mediano crassiusculo percursa, circiter 5 mm. longa, alba. *Labellum* cum pede gynostemii ligula elastica satis conspicua conjunctum, e basi ascendens, in apicem cartilagineum, contractum, toto ambitu oblongum, basi leviter incrassatum, sine lineis in disco, totum labellum 5 mm. longum, rubrum.

Gynostemium apice profunde tripartitum, margo posticus androclinii denticulatus. *Capsula* 0·9–1 cm. longa, 3·5 mm. crassa.

Colombia. Between Cartago and Anserma Vieja : epiphytic in dense forests upon the Belalcazar ; 1200–1600m., *Lehmann* 3836 !·(Herb. Kew.)—Fl. June.

Intermediate between *M. guianensis* Lindl. and *M. striatella* Reichb. f. ; from both species this new one differs by its narrower leaves, from the former by its longer flower-stalks and the shape of the lip, from the latter by its longer tails and also the lip. I must here add that as a result of a searching examination of the types in the Vienna herbarium the name *M. attenuata* Reichb. f. cannot be maintained, for the plant is identical with *M. guianensis* Lindl. The former was established in 1871, the latter in 1843. The geographical area of *M. guianensis* is now a very extensive one, but by no means the largest in this genus.

7. **Masdevallia simulatrix** *Kraenzl.* n. sp. ; differt a *M. simula* Reichb. f. pedicellis longioribus, flaccidis et fabrica labelli.

Radices pro plantula crassissimae, velamine copioso tectae, caespites ceterum parvi. *Caules* circiter 5 mm. longi. *Folia* anguste linearia, obtusa, triapiculata (?), teretia, ad 5 cm. longa, vix 1 cm. lata. *Scapi* filiformes, quam folia subbreviores, nudi vel vagina 1 ampla vestiti, 1–vel 2–flori, *bracteae* minutissimae. *Sepalum dorsale* profunde cucullatum (maxima pars floris), in caudam brevum ipso breviorem productum, a lateralibus mox liberum, 6 mm. longum, adeo cucullato-compressum, ut explanari non possit, *sepala lateralia* multo longius connata, subaequilonga, oblongo-lanceolata, acuminata, non proprie caudata, mentum breve, rectangulum formantia. *Petala* cuneato-rhombea, breviter acutata, vix 1 mm. longa, basin versus paulo longius evoluta. *Labellum* hastatum, longe unguiculatum, ungue anguste lineari laminae aequilongo, lobulis laminae retrorsis brevissimis, lineae elevatulae in basi laminae 2 oblique flexae. *Gynostemium* breve. Flores sicci atropurpurei, lineis intensioribus percursi, tenerrimi, succedanei.

Ecuador. Forests of Mauril : above Sisne and Zaruma ; 2300–2600 m., *Lehmann* 7007 ! (Herb. Kew.)—Fl. Dec., Jan.

A very elegant little plant with tiny flower-stalks and apparently dull purple flowers. It is presumably an epiphyte the roots being covered by an unusually thick velamen. The lip has exactly the shape of a spear-point, and the petals that of a rhombus with two sides a little longer than the others.

8. **Masdevallia Sanctae-Rosae** *Kraenzl.* n. sp. ; differt a *M. striatella* Reichb. f. cui habitu similis foliis angustioribus floribus paulo minoribus, labello lineari, petalis ovato-triangulis.

Radices tenues ; *caespites* parvi, densi. *Caules* 1 cm. longi, cataphyllis albidis tunicati. *Folia* e petiolo tenui in laminam linearem vel anguste lineari-lanceolatam dilatata, 4 ad 8 cm.

longa, ad 4 mm. lata, triapiculata (?), pedunculi creberrimi, ut videtur complures juxta ringula folia orientes, tenues, flaccidi, basi tantum vagina 1 muniti, ceterum nudi, ut videtur semper 1–flori, ad 5 cm. longi, quam folia semper breviores, *bracteae* brevissimae, oblongae, obtusae, pedicellos cum ovariis non aequantes. *Sepalum dorsale* ovatum, acutum, non caudatum, a lateralibus paulo latioribus mox liberum, *sepala lateralia* basi tantum connata, anguste triangula, acuta, non caudata, vix mentum sic dicendum formantia, omnia 7 mm. longa, dorsale 3, lateralia 4 mm. lata. *Petala* anguste triangula, acuta, 4 mm. longa, basi 2 mm. lata. *Labellum* a latere visum bis flexum, expansum lineare vel ligulatum, obtusum, apice integrum vel paulum erosulum, 3·5 mm. longum, circiter 0·5 mm. latum, lineis 3 elevatioribus percursum, textura firmiore quam cetera phylla. *Gynostemium* brevissimum, crassum. *Flores* ut videtur albidi, striati, omnino indecori.

Colombia. Antioquia ; forests of Savaneta, highlands of Santa Rosa ; 2400–2800 m., *Lehmann* 7269 ! (Herb. Kew.).

An extremely indifferent looking little plant. The abundance of flowers it produces does not in the least make up for its lack of beauty. The habit and general appearance is that of *M. striatella* Reichb. f. With *M. Ortgiesiana* Hort. it agrees in size and, somewhat, in general appearance, but it differs especially in the totally different lip.

9. **Masdevallia Corderoana** *F. C. Lehm.* in sched. herb. Kew ; differt a ceteris speciebus floribus tenerioribus, petalis apice cartilagineo-incrassatis, quasi praeustis.

Caespites mediocres, densi. *Caules* 2·5 ad 1 cm. longi, cataphyllis amplis, superne retusis tunicati. *Folia* lanceolata, acuta, cum petiolis in laminas aequilongas vel subbreviores dilatatis ad 18 cm. longa, ad 2 cm. lata. *Scapi* cum floribus 2 vel 3 succedaneis, 8 ad 9 cm. alti, tenues, florem versus leviter incrassati, nudi, *bracteae* ochreatae, vaginantes, pedicellos non aequantes, 8 ad 9 mm. longae, ovaria teretia, 6–sulcata, 5 mm. longa. *Cupula sepalorum* ampla, vix compressa, satis alte connata, lateralia mentum rotundatum, vix impressum formantia, in parte libera triangula, in caudas filiformes attenuata, dorsale cum cauda ipsi aequilonga ad 4 cm. longum, *sepala lateralia* 2·5 cm. longa, in parte cupulari 1 cm. lata, caudae 2 cm. longae. *Petala* e basi paulo angustiore ligulata, apice subbiloba, ibique cartilagineo-incrassata, in margine anteriore infra dente minuto, deflexo praedita, 8·5 mm. longa, 2·5 ad 3 mm. lata. *Labellum* (expansum) oblongum, (margine recurvo angustius) subpeltatum, basi excisum, apice deflexum obtusum ibique incrassatum et pilosum, lineae per discum 4, laterales paulum, prosilientes, totum 1·2 cm. longum, 4 mm. latum. *Gynostemium* petalis aequilongum, apice denticulatum. *Flores* pallide lutei, interdum albidi, cum lineis 3 fuscis in sepalo quoque, petala albida cum linea mediana purpureo-brunnea (et ceterum apice ejusdem coloris), labellum fuscum.

Ecuador. Churrucos: Eastern Andes of Sigsig; 3000–3200 m., *Lehmann* 6561 ! (Herb. Kew.)—Fl. Sept. and Oct.

The stalks of the leaves when fully developed are extremely long and apparently rather lax; the flower-stalks, including the flower, extend to about half the total height. The flowers are somewhat like those of *M. marginella* Reichb. f. and *M. auropurpurea* Reichb. f. but of a much thinner texture. The most striking feature of this species is the petals with their cartilagineous and dark coloured apex. I have examined the only existing, and fortunately very good specimen of this evidently very rare species in the Herbarium at Kew. In whose honour the plant was named by the collector I am unable to say.

10. **Masdevallia chiquindensis** *Kraenzl.* n. sp.; differt a *M. ionocharide* Reichb. f. habitu graciliore, caudis longioribus, labello oblongo, petalis angustioribus, basi non in dentum productis.

Caespites ut videtur parvi. *Caules* circiter 1·5 cm. longi, nigri, cataphyllis arctis, nigris tunicati. *Folia* e petiolo tenui sensim in laminam linearem vel lineari-lanceolatam dilatata, ad 15 cm. longa, 5 mm. lata, acuminata, minutissime apiculata. *Scapi* ut videtur semper 1-flori, folia subaequantes vel paulo breviores, tenuissimi, certe deflexi vel humistrati, basi nigri, nudi, *bractea* vaginans, apice obtusa, 1·2 cm. longa, scapi 3 cm. longi, vel ultra, *ovaria* satis alte costata, 6 ad 7 mm. longa. *Cupula sepalorum* propria brevis, circiter 8 mm. longa, *sepala lateralia* oblonga, subobliqua, in caudas tenuissimas ipsis semper longiores attenuata, mentum vix prominulum, non intrusum formantia, sepala ubi libera 1·5 cm. longa, 5 mm. lata, caudae fere 3 cm. longae, *sepalum dorsale* multo minus, triangulum, reflexum, pars libera 6 ad 7 mm. lata, sensim in caudam 3·5 cm. longam attenuatum. *Petala* linearia, basi non in dentum producta, sine linea incrassata pone marginem, 6 mm. longa. *Labellum* oblongum vel ellipticum, obtusum cum lineis 3 in disco, mediana apicem usque decurtente, in apice et ante valde incrassata, lineis lateralibus in tertia anteriore disci subito desinentibus ibique incrassatis, totum 6 mm. longum, fere 3 mm. latum. *Gynostemium* modice curvatum, 7·5 mm. longum, anthera pro rata magna. De colore florum viventium nil scimus, exsiccati *M. ionocharidi* Reichb. f. simillimi.

Ecuador. Forests of Chiquinda: Eastern Andes of Sigsig; 1600–1900 m., *Lehmann* 6528 ! (Unicum in Herb. Kew.)—Fl. May.

The plant has quite the growth and size of a slender form of *M. ionocharis* Reichb. f. but the examination of a flower showed important discrepancies both of petals and lip. The colour of the dried flowers is nearly the same as that of *M. ionocharis* Reichb. f.

11. **Masdevallia filamentosa** *Kraenzl.* n. sp.; differt a *M. chiquindensi* Kraenzl. et a *M. ionocharide* Reichb. f. sepalorum caudis pro florum magnitudine praelongis, a priore labelli lineis longius decurrentibus petalisque obtusis, ab altera caudis, magnitudine cupulae minore, petalis, labello.

Caespites ut videtur parvi. *Caules* 1·5 cm. longi, nigri, cataphyllis nigris tunicati. *Folia* e petiolo 1·5 cm. longo, nigro in laminam linearem, 7 ad 8 cm. longam, obtusiusculam, 5 ad 6 mm. latam, coriaceam, vix apiculatam dilatata. *Scapi* quam folia circiter semilongi, nigri, nudi, 1-flori, *bracteae* pedicellos non plane aequantes, acutae, 5 ad 6 mm. longae, (pedicelli 7 ad 8 mm.). *Cupula sepalorum* 5 ad 6 mm. longa, *sepala lateralia* non mentum proprium formantia, ubi libera lanceolata, 1·2 cm. longa, vix 3 mm. lata, sensim in caudas fere 5 cm. longas tenuissimas, filiformes attenuata, *sepalum dorsale*, ubi liberum triangulum, 3 mm. longum, in caudam 4·5 cm. longam productum. *Petala* ligulata oblongave, basi in dentem vix conspicuum evoluta, obtusa, cum linea paulum asymmetrica crassiore, vix 2 mm. longa. *Labellum* oblongum cum lineis 3 crassioribus, quarum laterales fere apicem usque decurrunt, totum 3 mm. longum, vix 1 mm. latum. *Gynostemium* pro flore crassum, pes modice ascendens, incurvus, cum sepalis lateralibus non connatus, de colore florum nil constat.

Ecuador. Forests near Chiquinda: Andes of Sigsig; 1600–2000 m., *Lehmann* 6520 ! (Herb. Kew.)—Fl. May and Aug.

Very similar to a slender form of *M. chiquindensis* Kraenzl., but with a smaller body to the flower and longer (comparatively speaking even very long) tails. The petals have a very small tooth near the base, the lip has the circumference and general appearance of the lip of the last species, but it is very different from that of *M. ionocharis* Reichb. f. I have chosen the name in allusion to the long tails. If there had been little teeth at the base of the petals of *M. chiquindensis* I would have considered this plant only a variety, all the more so as the habitat is also near Chiquinda, but it can be distinguished from either at the first glance.

12. **Masdevallia trigonopetala** *Kraenzl.* n. sp.; nulli affinior nisi *M. striatellae* Reichb. f. a qua differt pedicellis valde abbreviatis, petalis rite triangulis, labelli ligamento inusitate longo.

Species certe epiphytica. *Caules* breves, circiter 7 mm. longi, pallide flavi ut etiam cataphylla. *Folia* e petiolo sensim dilatata cum illis ad 7·5 cm. longa, 5 mm. lata, lanceolata, acuta, triapiculata, apiculo mediano longiore. *Scapi* cum floribus vix tertiam partem foliorum aequantes, 1-flori, 2 cm. longi, *bracteae* minutae, arcte vaginantes, pedicelli cum ovariis teretibus circiter 1 cm. longi. *Cupula sepalorum* elongata, 1 cm. longa, *sepala lateralia* lanceolata, in caudas ipsis subaequilongas producta, mentum nullum, sepala cum caudis

2·2 cm. longa, cupula basi 4 mm. alta. *Petala* breviter unguiculata, toto ambitu triangula, angulo antico leviter deflexo, non proprie in dentum evoluto, apice obtuse acutata, 3 mm. longa. *Labellum* ligamento longiusculo pedi gynostemii affixum, subpeltatum, lineare, basi leviter incrassatum, excisum, apice breviter bilobulum, 3 mm. longum, vix 0·5 mm. latum. *Flores* tenerrimi.

Habitat unknown. *Lehmann* sine No. (Herb. Kew. n. 345 !)—Fl. (?).

The plant seems to be very rare. I have seen only 2 specimens but fortunately they were sufficient for diagnosis. The shortness of the flower-stalks is very remarkable, also the truly triangular petals and the long hinge of the very narrow lip. The flowers are of a very thin and fragile texture and scarcely reach the middle of the narrow leaves, the pedicels themselves being still much shorter. The habitat of the plant cannot be given with any certainty. There is a name written by Lehmann in pencil but I am quite unable to read it, certainly it is none of the well-known or often quoted localities.

13. **Masdevallia chimboensis** *Kraenzl.* n. sp.; differt a *M. cupulari* Reichb. f. cui certe proxima labello latiore indumento humiliore potius velutino quam papilloso tecto, petalis apice subbilobulis.

Planta epiphytica elegans, parvula, *caespites* certe parvi, *radices* tenues. *Caules* circiter 3 mm. longi. *Folia* breviter petiolata, oblonga, acuta, tenui-coriacea, margine leviter revoluta, petioli 1 cm., laminae 2·5 cm. longae, 8 ad 10 mm. latae. *Scapi* folia paulo superantes, nudi, 1–flori, *bracteae* pedicellos cum ovariis non aequantes, oblongae, acutae, 5 ad 6 mm. longae, *ovaria* cum pedicellis geniculata, 3·5 mm. longa, teretia, vix sulcata. *Cupula sepalorum* brevis, satis ampla, *sepala lateralia* ad 1 cm. connata, mentum paulum prosiliens, rotundatum formantia, toto ambitu oblonga sensim in caudam ipsis paulo breviorem attenuata, cum caudis 2·3 cm. longa, ubi libera 4 mm. lata, *sepalum dorsale* brevius, ex apice triangulo in caudam ipsi aequilongam attenuatum, cum illa 2·3 cm. longum, haec omnia sicca fusco-purpurea. *Petala* ovata, apice leviter incrassata involutaque, 5 mm. longa, basi 2 mm. lata, tenera. *Labellum* crassiusculum ligulatum, obtusum, lineis 3 crassis papillosis, per totum, discum apicem usque percursum, ibique densius papillosum, papillis tamen parum prosilientibus, totum purpureum, 8 mm. longum, 2·5 mm. latum. *Gynostemii pes* paulum productus.

Ecuador. Forests of Puente de Chimbo: Western Andes of Milagro; 200–300 m., *Lehmann* 6748 ! (Unicum in Herb. Kew) Fl. Apr., May.

It is very difficult to state the affinity of this plant. By the roughness of the anterior part of the lip one might be inclined to place it among the *Leontoglossae*, but the warts are too small to

make the impression of a rough tongue. The flowers show (at least in the dried state) a uniform somewhat dirty purplish tint; on more accurate examination the ground-colour is discovered to be whitish and densely covered with numerous purple spots. The size of the flowers is, in proportion to the whole plant, a rather considerable one, nearly 1 inch for a short plant scarcely exceeding 2 inches.

14. **Masdevallia endotrachys** *Kraenzl.* n. sp.; differt a *M. civili* Reichb. f. cui proxima tota fauce cupulae densissime papillosa, floribus nutantibus vel deflexis, minoribus, petalis in margine postico leviter curvatis.

Planta terrestris. *Caespites* maximi, densi. *Caules* 3 ad 4 cm. longi, cataphyllis pallidis, scariosis tunicati. *Folia*, e petiolis crassiusculis sensim dilatata, lineari-lanceolata, acuta, vix apiculata, crassa, carnosa, viva viridi-lutea, 8 ad 12 cm. longa, 7 ad 8 mm. lata. *Scapi* tenues foliis subaequilongi vel vix breviores, nudi vel vaginula 1 cincti, bracteae longe tubulosae, quam pedicelli multo breviores, circiter 1 cm. longae, ovaria teretia, 4 mm. longa, cum pedicellis saepissime geniculata. *Cupula sepalorum* 1 cm. longa, *sepala lateralia* mentum rectangulum, rotundatum formantia, quam dorsale paulo longius connata, omnia apice triangula, sensim in caudas lineares, subtus papillosas, ipsis breviores angustata, cum caudis circiter 2·5 cm. longa, pallide viridi-lutea, intus carinis prosilientibus papillisque densis praedita. *Petala* oblongo-lanceolata, acuta, antice, cum angulo fere recto, postice leviter curvata ibique cum linea paulo crassiore pone marginem, 7 mm. longa, medio fere 3 mm. lata. *Labellum* ligulatum, antice leviter dilatatum et margine crenulatum, cum carinulis 2 paulum prosilientibus in disco et linea elevatula inter utramque, in tertia anteriore dense papillosum, 10 ad 12 mm. longum, 3·5 ad 4 mm. latum, lilacino-brunneum vel rubrum. *Gynostemium* brevissimum, superne obscure tripartitum, pes brevis, incurvus.

Ecuador. Prov. Imbabura: abundant and sometimes in large masses on "cangahua" soil around la Pasta, Pucaná, el Puntal and Rumichaca; 2500–2800 m., *Lehmann* 6741! (Herb. Kew.). "Always in flower"—F. C. L.

Lehmann has distributed this plant under the name of *M. Bonplandi* Reichb. f. but this is quite erroneous. The materials are fortunately so rich and in such a satisfactory condition that I could dissect a flower, and the examination of the interior parts showed plenty of discrepancies not only from *M. Bonplandi* but also from *M. civilis* Reichb. f., certainly the nearest species. The name "endotrachys" means that the flower is rough and hairy inside. Lehmann states that the plant covers a certain type of soil in large patches; the rudiments of the roots however show the velamen of a true epiphytic plant.

15. **Masdevallia chlorotica** *Kraenz'.* n. sp.; differt a *M. triangulari* Lindl. floribus paulo minoribus intus luteis, extus

viridi-suffusis, petalis apice obtuse bilobulis, caudis fere semper omnibus decurvis.

Caespites satis densi, radicibus copiosis obsiti. *Caules* ad 2 cm. longi, cataphyllis laxis brunneis omnino tunicati. *Folia* longe petiolata, e basi cuneata oblonga, acuta, tenui-coriacea, 6·5 ad 13 cm. longa, 1·5 ad 2·8 cm. lata, petioli et laminae aequilonga. *Scapi* uni-vel biflori, cum floribus ut videtur semper subsemilongi quam folia, tenues, nudi, *bracteae* oblongae, acutae, 5 ad 6 mm. longae, ovaria subaequantes. *Cupula sepalorum* ampla, brevis, profunde fissa, *sepalum dorsale* triangulum, sensim in caudam filiformum attenuatum, 1·5 cm. longum, cauda 1·5 cm. longa, *sepala lateralia* mentum leviter intrusum formantia, ad 4 cm. longa, basi 7·5 mm. lata, caudae ipsae 2 cm., tota cupula intus intense lutea, extus viridi-suffusa. *Petala* linearia, apice obtuse biloba, basi in dentem parvum linearem, incurvum aucta, cum linea crassa pone marginem, 7·5 mm. longa, 2 mm. lata. *Labellum* ligulato-obovatum, basi excisum, apice retusum, apiculo reflexo, cum lineis 3 per discum, quarum laterales breviores, antice incrassatae, 7·5 mm. longum, 2 mm. latum. *Gynostemium* petalis aequilongum.

Colombia. Central-Andes of Popayan: epiphytic and terrestrial in dense forests on the Paramo de las Delicias; 3300–3600m., *Lehmann* 8506 ! (Herb. Kew.). Fl. Jan. and Feb.

A very remarkable species. The flowers are of a good size and structure and the colours—a gay yellow inside combined with a greenish hue outside—are very peculiar. By its purely technical character the plant ranges among the crowd of species showing more or less affinity to *M. triangularis* Lindl., and the nearest seems to be *M. Paiveana* Reichb. f. of Bolivian origin. As the specimens at hand were abundant, the species seems to be rather frequent in its habitat near to the clouds and the eternal snow. It shows also some external resemblance to *M. chrysoneura* Lehm. et Kraenzl. especially in dried state, but the colours, the petals and the lip are totally different.

16. **Masdevallia fertilis** *Kraenzl.* n. sp.; differt a *M. carpophora* Kraenzl. statura majore, floribus omnino ecaudatis, labello lineari.

Caespites densi. *Caules* 2 ad 3·5 cm. longi. *Folia* e petiolo 3 ad 3·5 cm. longo in laminam oblanceolatum, obtuse acutatam, margine reflexam, crassam, carnosam dilatata, cum petiolis 8 ad 12 cm. longa, 1 ad 1·5 cm. lata. *Scapi* satis copiosi, uniflori, cum floribus quam folia semilongi, vaginula 1 cincti, bracteae non visae, pedicelli circiter 1·5 cm. longi, ovaria sub anthesi tertia, 6-sulcata, costae non alatae. *Sepala* basi tantum 5 ad 6 mm. longe connata, lateralia mentum globosum formantia, ceterum ut etiam dorsale triangula, acuminata, extus manifeste carinata, non proprie caudata, 1·3 cm. longa, basi vix 3 mm. lata. *Petala* oblonga, acuta, 6 mm. longa, medio fere 1 mm. lata. *Labellum* ligulatum e basi paululo

latiore vix angustatum, obtusum, lineis 2 elevatulis, antice in unam confluentibus fere apicem usque percursum, ad 1 cm. longum, basin versus 2 mm. latum. *Gynostemium* crassissimum, altum atque latum, androclinium fusco-marginatum (an fortuito ?). *Capsula* matura 1·3 cm. longa, 5 mm. crassa. Post anthesin collecta, flores omnes foecundati, verosimiliter autogami.

Colombia. Antioquia : forests along the Rio Chico above San Pedro and near to El Valle between Sta. Rosa and de Oros and around Yarumal ; 2200–2600 m., *Lehmann* 7037 ! (Herb. Kew.). Fl. May, June.

The specimens were gathered at various localities and as all the flowers I had for examination were fertilized I presume that self-fertilization is the rule. The description points out the thoroughly identical result of the examination of 2 flowers, and we may therefore presume that in spite of the fact that they were at the top of ripe capsules the diagnosis is as satisfactory as can be made from flowers of this condition. The column was a thick, clumsy body, the anther-bed was square and narrow, and the stigmatic surface was as long as the whole front of the column. The anther and the pollen masses were wanting. Though the flowers seem to be autogamic I must add that there is no trace of any pelorioid structure.

17. **Masdevallia pusilla** *Rolfe* in *Kew Bull.* 1893, 335 ; Woolward, Monogr. Masd. tab. color. [66].*

" Habitat not recorded ! "

The plant flowered several times at Glasnevin and from a specimen sent from there to Miss Woolward the picture in the Monograph quoted above was drawn. Among the Masdevallias of the Kew Herbarium collected by the late F. C. Lehmann there is a specimen with some flowers which differs from Miss Woolward's picture only in possessing somewhat larger leaves but a dissection of a flower showed all characters given by Mr. Rolfe in his diagnosis. The habitat of Lehmann's 7016 ! is Ecuador. He remarks :—" The plant grows in thick wet forests at the Cuesta de Amboca above Zaruma at 1200–1600 m.

18. **Masdevallia diversifolia** *Kraenzl.* n. sp. ; nulli affinior ; a *M. heteroptera* Reichb. f. cui forsan proxima differt sepalis basi per breve spatium connatis, vix semilongis, petalis basi latioribus, non cuneatim dilatatis, pede gynostemii breviore, gynostemio apice non denticulato, obtuso.

Caules 1 ad 2 cm. longi, cataphyllis marcescentibus tunicati. *Folia* e petiolo brevi vel longiusculo spathulata, oblanceolata vel obovata, magnitudine in uno eodemque specimine

* As the plates of this splendid monograph are issued strictly alphabetically and without numeration I have, for my convenience and to facilitate the quotation, numerated the plates 1 to 87 and I have added the numbers in square brackets. I am sure that every botanist who has to deal with this indispensable work for the knowledge of *Masdevallia* will be obliged to follow the same expedient.—F. K.

diversissima, incl. petiolis 3 cm., 3·5 cm., 4·25 cm., 5·5 cm. vel 8 cm. longa, 0·4 cm., 0·6 cm., 1·0 cm. vel 1·5 cm. lata, biapiculata cum mucronulo. *Scapi* folia paulo excedentes, 8 ad 10 cm. longi, flores circiter 5, longum per tempus succedanei, subdistichi, *bracteae* vaginantes, retusae, carinatae, circiter 5 mm. longae, pedicellos apice incrassatos non aequantes, 6 mm. longae. *Cupula sepalorum* brevissima, *sepalum dorsale* ovatum, acutum, 8 mm. longum, in caudam (infeliciter haud integram) productum, *sepala lateralia* mentum paulum prominulum, rotundatum formantia, dimidio longiora, lanceolata, acuminata, 10 mm. longa, 3 mm. lata, in caudas apice hamatas (semper ?) ipsis aequilongas producta. *Petala* 4 mm. longa, basi producta vel breviter decurrentia, curvula, apice bilobula, lobulo vel apice anteriore longiore, utroque obtuso, cum linea mediana et altera subobsoleta pone marginem anteriorem. *Labellum* aequilongum, carnosulum, ligulatum, obtusum, basin versus leviter repandum, cum lineis 2 per discum, antice cum apice crassiusculo confluentibus. *Gynostemium* breve, crassum, in apicem obtusum productum. *Capsula* triquetra, crassiuscula, 1 cm. longa, medio ad 7 mm. lata, de colore nil refert collectore.

Ecuador. Eastern Andes of Loja: forests of Matala: 2800–3200 m., *Lehmann* 7008!?—Salanilla (in handwriting of *Lehmann*).—Fl. Oct.–Dec.

The plant looks like a *Scaphosepalum*, and the flowers externally resemble those of *M. picturata* Reichb. f., a short examination shows however many discrepancies in every part. In the 5 (very bad and mostly flowerless) specimens I had at hand, nearly all the leaves varied in size, and from their character I have taken the name of the species. The place "Sabanilla" quoted by Lehmann is certainly the so-called Nudo de Sabanilla (the habitat of *M. caloptera* Reichb. f.), a part of the Andes of Loja and not the town of the same name not far from the mouth of the Rio Magdalena on the Caribbean Sea.

19. **Masdevallia quiliehaoensis** *Lehm. et Kraenzl.* n. sp.; *M. scandenti* Rolfe habitu et magnitudine similis, differt sepalis lateralibus fere omnino connatis, petalis apice dilatatis ibique papillosis, et labello basi quadrato, antice plano, intus ecalloso.

Planta epiphytica. *Rhizoma* oblique ascendens, satis longum, radicibus crebris crassiusculis obsitum. *Caules* 5 ad 6 cm. longi, cataphyllis arcte vaginantibus tunicati. *Folia* e petiolo anguste alato sensim in laminam longam, lineari-lanceolatam dilatata, breviter acutata, triapiculata, apiculo mediano longiore, 15 ad 22 cm. longa, 1 ad 1·2 cm. lata, membranacea. *Scapi* folia excedentes, ad 30 cm. alti vel altiores, tenues, vaginis paucis valde dissitis vestiti, pauciflori, floribus ad 3 succedaneis, *bracteae* 1·5 cm. longae, 5 mm. latae, quam pedicelli paulo longiores, ovaria curvula, subteretia, haud manifeste triquetra, 5 mm. longa. *Cupula sepalorum* brevis, ampla, *sepalum dorsale* fere omnino liberum, basi tantum cum lateralibus cohaerens,

oblongum, acutum, in caudam brevem contractum, ipsum 1·3 cm. longum, cauda 1 cm. longa vel vix longior, *sepa'a lateralia* fere omnino connata, synsepalum concavum, conchiforme, non tamen mentum formantia, acuta, in caudas vix 1 cm. longas contracta, tota cupula alba, brunneo-suffusa. *Petala* minuta, linearia, apice, dilatata, incrassata ibique papillosa, nec tamen bivalvia, vix 3 mm. longa. *Labellum* toto ambitu spathulatum, basi subquadratum, margine incrassatum, medio linea brevissima, crassiuscula instructum, antice planiusculum, rotundatum, ecallosum neque lineis incrassatis, radiantibus percursum, 5 ad 6 mm. longum, antice 2·5 mm. latum. *Gynostemium* acutum, petalis aequilongum.

Colombia. State of Cauca: very damp forests on the western declivities of the Central-Cordillera of Popayan; 2000 m., *Lehmann* 2667 ! (Herb. Kew.).—Fl. Mar.

The plant resembles at first sight *M. scandens* Rolfe, from which it differs by slender growth, narrower and longer leaves, a short few-flowered raceme (instead of the one-flowered stalks of *M. scandens*), coloured petals and lip. It is very difficult to give it the right place among the other *Masdevallias*. Taking into consideration a certain resemblance in the form of the petals and the lip I believe it can be placed at the end of the *Saccilabiatae* where I have united some other aberrant species under the name of *Saccil. spuriae* in a subsection annexed to the main section.

20. **Masdevallia anachaete** *Reichb. f.* Otia Hamburg; (1878) 17; descr. hic ampliata; differt a *M. Sprucei* Reichb. f. statura etiam minore, floribus omnino multo minoribus cupula sepalorum deflexa, caudis sepalorum subparallelis, arcte ascendentibus, labello spathulato.

Inter minimos generis, dense caespiticia. *Caules* 3 ad 4 mm. longi, cataphyllis griseis, retusis tunicati. *Folia* spathulata, obovato-oblonga, in petiolum canaliculatum sensim angustata, apice rotundata, minutissime triapiculata, apiculo mediano longiore, cum petiolo plerumque semilongo ad 2 cm. longa, 5 ad 6 mm. lata. *Scapi* subduplo longiores, folia semper superantes, ad 4 cm. alti, nudi, teretes, 1–vel (rarissime) 2-flori, floribus succedaneis, energice decurvis, bracteae vaginantes, superne retusae, 2·5 cm. longae, pedicellos necnon ovaria excedentes, ovaria trigona, costis per paria approximatis, valde et interrupte undulatis. *Cupula sepalorum* brevissima, *sepala lateralia* mentum brevissimum vix sic dicendum formantia, paulo longius connata, dorsale lateralibus ceterum aequale, dorso alte carinatum, omnia lanceolata vel anguste triangula, in caudas aequilongas, lineares, ascendentes, sepalis subparallelas attenuata, sine caudis 6 mm. longa, basi 1·5 mm. lata. *Petala* anguste linearia, acuta, antice angulum obscure obtusum formantia, apicem versus denticulata, 2 mm. longa, vix 1·2 mm. lata. *Labellum* curvulum, ovatum, valde complicatum, in parte superiore utrinque

rotundatum (nec tamen trilobum dicendum), antice longe productum, apice obtusum, vix explanandum, lineae fere in unam confluentes 2 per totum discum. *Gynostemium* apice acutatum, non denticulatum. Pars superior floris albida, infer'or (sep. later.) violacea, caudae luteolae.—*M. vulcanica* Kraenzl. in Fedde Repert. xvii (1921) 413; *M. nutans* Lehm. et Kraenzl. l.c. xvii (1921) 431.

Ecuador. Quito: Colorados de Sto. Domingo; in volcanic soil ("Lavaboden"), *Lehmann* (sine No.) Herb. Orch. xxxii.—Reichenbach's type specimen in Vienna Herbarium!; Rio Silante, Western declivities of the Corazon in 2500 m., *Lehmann* (sine No. !). *M. vulcanica* Kraenzl. same locality, *Lehmann* 3061! *M. nutans* Lehmann in sched. Lehm. et Kraenzl. in l. supra cit. (Herb. Barbey-Boissier.).—Fl. Jan.–Mar.

This species is very scarce in European collections and in consequence of the very imperfect diagnosis it was misunderstood by Lehmann, who collected it and quoted the name, among several species of *Amandae*, as the section was formerly named, in Woolward, Monograph, under *M. pachyura* Reichb. f. Probably misled by this false interpretation R. A. Rolfe determined another *Masdevallia* of Lehmann as *M. anachaete* which proved to be a quite different species. Subsequently I have been in considerable doubt as to the true *M. anachaete* and I take the opportunity to unite 2 species viz. *M. vulcanica* Kraenzl. and *M. nutans* Lehm. et Kraenzl. (both published in Fedde's Repert. xvii (1921) 413 and 431) with *M. anachaete*. The source of all these misunderstandings is the very imperfect original diagnosis in the Otia. Reichenbach says nothing about the s'ze and dimensions of the single parts of the plant, the concluding remark "dimensiones *M. minutae* Lindl." being quite insufficient.

According to Reichenbach the plant belongs to his section of "Clausae porrectae," i.e. *Masdevallias* with closed flowers which are directed straight forward. The latter character does not agree in this case, the flower being bent downwards, parallel and appressed to the flower-stalk. The *diagnosis emendata* I now publish is written with Reichenbach's type-specimen in front of me in the Vienna Herbarium.

21. **Masdevallia Echidna** *Reichb. f.* in Bonplandia III (1855), 69; Walp. Ann. VI. 195.—*M. muscosa* Reichb. f. in Gard. Chron. (1875) I. 460, (1881) II. 336, (1887) I. 836, II. 522; Ann. Bot. I. 237 t. 12; Veitch, Man, Orch. Pl. V. 54; Woolward, Monogr. Masd. with col. plate [39]*; Bot. Mag. tab. 7664.—*Porroglossum muscosum* Schlechter in Fedde, Repert. Beih. vii (1920) 83.

We have here a rather intricate problem. The specimens in Reichenbach's herbarium both of *M. Echidna* and of *M. muscosa* are all alike. The little analytical sketch of the latter,

* See footnote p. 109.

though rather carelessly done, agrees in every point with Miss Woolward's painting [tab. 39].* The comparison in the original diagnosis with *M. verrucosa* Reichb. f. is not a very good one, as this species belongs to *Scaphosepalum* Pfitzer. All the main characters of both species, the former published in 1855, the second in 1875, are strictly the same. The number of flowers developed is certainly very large and in a long succession. On the same flower-stalk no less than 13 have been counted and as there was still a bud probably more would have developed. The flowers I had for examination and comparison are exactly the same in the following specimens: COLOMBIA. Antioquia, Alto de San Francisco (*Wagner* !)—the latter specimen was labelled by Reichenbach *M. Echidna*.—Antioquia (*Wallis* !) without precise locality; this is the specimen with 13 or more flowers. —Sta. Fé de Bogotá (*Man.* 1018 !).—Western Ecuador, Milligalli on the western declivities of Corazon (*Lehmann* 313 !). All these specimens are in the Vienna Herbarium. In the principal collection (at Kew) there is also a specimen of Colombian origin—Antioquia, forests near Navino (*Lehmann* 7023 !).—Regarding the identity of all the specimens I have no doubt that we must replace the old well-known name *M. muscosa* by the older, and fortunately not inappropriate, *M. Echidna* Reichb. f.

Dr. R. Schlechter of Dahlem has established upon this plant his new genus *Porroglossum*. I regret very much that I am unable to agree with him in this case. All the characters for separation can without exception be observed in plenty of other species, and in not a few of them, more developed (e.g. the bilabiate structure of the cupula, the curved ascending foot of the column and others). The whole feature of the plant is so exactly *Masdevallia*-like that even non-specialists in Orchids would recognise it without hesitation as belonging to this genus. Certainly it would be highly desirable to break up all the huge genera into smaller ones but for that we require discrepancies of a greater degree than we have in the present case. As things are *M. Echidna* proves to be the type of an excellent and easily recognisable section but by no means that of a new genus.

22. **Scaphosepalum odontochilum** *Kraenzl.* n. sp.; differt a *S. swertiifolio* Rolfe statura majore, foliis majoribus, sepalis ecaudatis, labello antice profunde dentato.

Radices copiosae, satis tenues. *Caules* 2·5 cm. longi, cataphyllis scariosis, superne retusis tunicati. *Folia* longepetiolata, subobliqua, membranacea, petioli 8 ad 10 cm. longi, sensim in laminas aequilongas vel subbreviores dilatati, laminae apice valde protractae, ad 10 cm. longae, medio ad 3 cm. latae. *Scapi* tenuissimi, foliis aequilongi, vaginulis perpaucis vestiti, pauciflori, floribus succedaneis secundis, *bracteae* lanceolatae acuminatae, tenerrimae, 5 ad 6 mm. longae, ovaria curvula-

* See footnote p. 109.

triquetra non aequantes. *Sepalum dorsale* ovatum, acutum, dorso leviter carinatum, profunde excavatum, 8 mm. longum, basi 5 mm. latum, *sepala lateralia* ultra dimidium connata, ovata, longius acuminata, vix caudata dicenda, apicibus incurvis, 9 mm. longa, basi 4 mm. lata. *Petala* oblique oblonga, valde asymmetrica, acuta, 3·25 mm. longa, medio 2·5 mm. lata. *Labellum* trilobum, lobi laterales parvi, rotundati, lobus intermedius antepositus ovatus, margine grosse dentatus, totum labellum circiter 2·5 mm. longum. *Gynostemium* longum, valde curvatum, apice alatum, rostellum pro rata longum, *Capsula* 1·5 cm. longa, 4mm. diametro leviter curvata. *Flores* sicci pallide rosei, tenerrimi.

Colombia. Sine loco speciali. No. B.T. 172 ! *Lehmann*! (Herb. Kew).

Resembles very much *S. swertiifolium* Rolfe, but differs by its larger leaves, smaller flowers without tails and the deeply toothed blade of the lip. The column is comparatively long and the lower part curved following the hollow of the odd sepal. The rostellum is larger and more protruding than in any other species of this affinity.

23. **Cryptophoranthus Rolfeanus** *Kraenzl.* n. sp.; differt a *C. hologlottide* Schlechter foliis angustioribus basin versus acutatis, non rotundatis, petalis exacte rhombeis, acutis, labello toto margine minute denticulato, floribus extus pluries carinatis carinisque denticulatis.

Caules fasciculati, ascendentes, triarticulati, 6 ad 10 cm. longi, vaginae carinatae, ad ostium oblique ovati, acuti. *Folia* longe (3 ad 4 cm.) petiolata, oblonga vel oblongo-lanceolata, acuta, basi in petiolum angustata, 3–apiculata, ad 13 cm. longa, 3·5 ad 4 cm. lata. *Racemi* pauciflori, flores 4 ad 5 coaetanei, si mavis racemi pauci-vel uniflori, 2 cm. longi, vaginulis 2 brevibus vestiti, *bracteae* vix dimidium pedicellorum aequantes, ovaria 6–costata, costis valde undulatis denticulatisque. *Flores* purpurei, anguste ventriculosi, basi breviter saccati, apice valde in rostrum deflexum producti, 1·8 cm. longi, *fenestrae* ut videtur longiusculae, *sepala lateralia* ab intermedio facile separanda. *Petala* rhombea, longius acutata, tenerrima, vix 3 mm. longa. *Labellum* satis late unguiculatum, longius acuminatum, sagittatum, lobi laterales lineares, reflexi, toto margine minute denticulatum, lineis 3 satis manifestis percursum, ceterum non papillosum, 4·5 mm. longum, inter lobos laterales 1·5 mm. latum.

Ecuador. Western-Andes of Cuenca: forests of Chaca-Yaca; 300–600 m., *Lehmann* 4516 ! (Unicum in Herb. Kew.) —Fl. Nov.

The marginal teeth of the lip cannot be seen except under very strong magnification of, at least, 40 diameters. The flower-stalks are clothed with several very short sheaths, forming

a bundle of one-flowered racemes. The ribs of the flowers (outside) are furnished with minute teeth.

24. **Cryptophoranthus Argus** *Kraenzl.* in Fedde Repert. xvii. (1921) 437.—descr. emend.

Caules fasciculati, leviter compressi, 6 ad 15 cm. alti, vaginis ad 4 interdum magnis, subfoliaceis, teneris, oblongis, acutis vestiti. *Folia* longe (interdum ad 5 cm.) petiolata, latissime oblonga vel elliptica, obtusa vel brevissime apiculata, 13 ad 16 cm. longa, 6 ad 8 cm. lata. *Flores* fasciculati (rectius racemi uniflori) basi vaginulis 2 vel 3, superne bractea pedicellum non aequante vestiti, ovaria 6–costata, in costis crispatula. *Sepala* in utriculum longiusculum obovato-vel clavato-cylindraceum, extus, multicarinatum, in carinis asperulum, 1·5 cm. longum connata, apex utriculi deflexus, *fenestrae* in dimidio anteriore angustae. *Sepalum dorsale* oblongum, acutum, *lateralia* bene latiora, omnia intus scabriuscula. *Petala* subquadrata vel irregulariter 5–gona, breviter acutata, ad 5 mm. longa, 2 mm. lata. *Labellum* unguiculatum cum ungue quadrato, hastatum, lobis lateralibus acutis, lobo intermedio acuminato cum carinulis 2 vix conspicuis e lobis lateralibus in discum labelli transeuntibus (more *Masdevalliarum* complurium), totum labellum vix 4 mm. longum, basi vix 3 mm. latum. *Gynostemium* apice retusum, margine minute denticulatum.—Flores purpurei.—*Masdevallia Argus* Rchb. f. ex Kraenzl. l.c. 438.

Ecuador. Cordillera de Amboca : on trees in thick forests above Zaruma ; 1200–1700 m., *Lehmann* 6934 !

Colombia. Western Andes of Tuquerres : on trees near Pipulquer ; 1500–1800 m., *Lehmann* 7050 ! (Herb. Kew.).

In the herbarium Reichenbach at Vienna there is a medium sized specimen of this species with some analytical figures drawn by Reichenbach, named *Masdevallia Argus*, but never published. This specimen was found by Schlim near S. Pedro (No. 760 !) and near Ocaña (No. 762 !, 764 !). I have revised my first description after having examined the Lehmannian specimen of this principal (Kew) collection and I am glad to have been able to correct some characters, thanks to this better material. It is by far the largest species known up to the present, the sheaths of the stem are developed into a leaf-like blade but in consequence of their thinner texture soon decay. The plant on the whole resembles somewhat *Bulbophyllum reticulatum* Batem.

25. **Cryptophoranthus pleurothallopsis** *Kraenzl.* n. sp. ; nulli proprie affinis, habitu omnino ad *Pleurothallidem* vergens; racemis longe pedicellatis, uni-vel spurie bifloris ab omnibus diversus.

Caespites parvi haud densi, radicibus copiosis, tenuibus obsiti. *Caules* cataphyllis quibusdam ochreatis, ad orificium rigentibus, acutis tunicati, ad 3 cm. longi. *Folia* lanceolata, e

petiolo 1·5 cm. longo, tenui, in laminam 4 ad 5 cm. longam, 1 ad 1·2 cm. latam dilatata, biapiculata. *Scapi* tenues, plerumque 2 succedanei, ex eadem vagina cum folio orientes, paulo semilongiores quam folia, *bracteae* plerumque 2, quarum altera inanis, rarius alabastrum obsoletum proferens, pedicelli torti, tenues, 4 mm. longi. *Sepala* in utriculum ellipsoideum vel leviter ovatum, apice obtusum, non deflexum connata, ut videtur (e floribus siccis scil.) maxima pro parte leviter conglutinata, non proprie fenestrata, mentulum in basi nullum vel obscurissimum, totus flos 1·4 cm. longus, basi 4 ad 5 mm. diametro. *Petala* spathulato-rhombea, obtusa, minutissime punctulata, 5 mm. longa, fere 3 mm. lata. *Labellum* toto ambitu lineare, antice leviter dilatatum ibique convexum, apice incrassatum deflexumque, lineis 3 elevatulis fere apicem usque percursum, in tertia anteriore utrinque minutissime denticulatum, 7·5 ad 8 mm. longum, 2 mm. latum. *Gynostemium* apicem versus late alatum, alis rotundatis, androclinii margo postice tridenticulatus, totum 4 mm. longum, apicem versus 3 mm. latum. *Flores* sicci intense purpurei. *Capsula* 6-costata, semimatura 1 cm. longa, perigonio haud valde mutato coronata.

Colombia. Antioquia: on trees in thick, damp forests around San Gregorio and Narino; 2000–2400 m., *Lehmann* 7272 ! (Herb. Kew.)—Fl. Dec.

There can be no doubt that without flowers everybody would be convinced that this plant must be a *Pleurothallis*. The flowers are certainly pretty for a species of this genus, the lip is linear in its outline, and neither hastate nor arrowlike as in other *Cryptophoranthus* species.

Pseudoctomeria *Kraenzl.* (nov. sect. *Masdevalliae* ?) nov. genus.

Sepala lateralia in synsepalum basi saccatum minute biapiculatum connata, *sepalum dorsale* oblongum, acutum, carinatum, a medio liberum. *Petala* cuneata, antice obtusangula. *Labellum* obscure trilobum, lobi laterales paulum evoluti, rotundati, lobus intermedius ligulatus, obtusus, crasse carnosus. *Gynostemium* leviter curvatum, pes ascendens, anthera obscure bilocularis, pollinia 2, ovarium teres, dense grosseque papillosum.—*Caules* dense caespitosi, triarticulati, cataphyllis vestiti, internodia longa, internodium supremum monophyllum, pedicelli vel potius *racemi* uniflori, vagina 1 paulum supra basin vaginaque vel bractea ad basin pedicelli vestiti. *Flores* coaetanei, parvi.

26. **Pseudoctomeria lentiginosa** *Kraenzl.* n. comb.; differt a *Masdevallia* Ruiz et Pav. et a *Pleurothallide* R. Br. caule elongato, internodis 3 longiusculis vaginatis composito necnon racemulis 1-floris in apice caulis congestis, a *Cryptophorantho* Barb. Rodr. floribus apertis non in utriculum connatis.

Planta epiphytica. *Radices* numerosae, tenues. *Caules* in caespites densos congesti, internodis tribus 1·5 cm. longis

compositi, cataphyllis tunicati, cataphyllum supremum vaginam amplam, ad orificium obtusam ringentem efficiens. *Folia* singula, e petiolo 2·5 ad 4 cm. longo, saepius nigricante in laminam lanceolatam, triapiculatam, carnosam dilatata, laminae 4·5 ad 6 cm. longae, 8 ad 12 mm. latae. *Racemi* uniflori, 3 ad 4 simul orientes, ad 1 cm. longi, bracteae ochreatae, vaginantes, 2·5 mm. longae, papillis scabrae, ovaria teretia, 2 mm. longa, etiam densius papillosa. *Flores* 3·5 ad 4 mm. longi. pallide lutei. *Sepalorum* apices leviter recurvi, non in caudas elongati, sepala ceterum conniventia, pedi gynostemii modice ascendenti affixa, mentum pro flore magnum, saccatum, quartam vel tertiam partem sepalorum lateralium occupans. *Petala* vix 2 mm. longa, antice circiter 1·5 mm. lata.—*Labellum* aequilongum, pars anterior (vel lobus intermedius) crassa, dense carunculosa. *Gynostemium* supra descriptum.—*Pleurothallis lentiginosa* Lehm. et Kraenzl. in Engl. Jahrb. xxvi (1899), 446.

Costa Rica. Above San Isidro, epiphytic, a little above the soil in dense humid woods; Irazu Mountains, on the western declivities, 2000 m., *Lehmann* 1750 ! (Herb. Kew.)—Fl. Dec.

The plant was labelled by Lehmann with hesitation "Octomeria ?", the late Mr. R. A. Rolfe examined the flowers and seeing that Lehmann's doubts were in every respect justified placed it among the *Masdevalliae indeterminatae*, but without saying more about it. Regarding the habit there is indeed a strong resemblance to *Octomeria* beginning from the base of the stem to the rigid, fleshy leaves, but the flower shows all the characters of *Masdevallia* and none of true *Octomeria*. The most striking feature not yet remarked upon either in these two genera or in *Pleurothallis* is the pedicels, or what is more correctly called the bundle of 1-flowered inflorescences, arising from the top of the stem just beneath the petiole. As the pedicels bear 1 (or sometimes 2?) small leaflets below the bract we must consider them morphologically not as simple flower stalks but as the axis of an inflorescence. These peculiarities—the long jointed stems, and the sheath-like leaf at the base of the small one-flowered racemes, which are united into a bundle—though all of merely morphological value, are never observed in *Masdevallia*, and justify the formation of a new genus. Twenty-five years ago, when I was dealing for the first time with Lehmann's Orchids, I described the same plant as a *Pleurothallis sp.* and compared it with *P. tribuloides* Lindl. The herbarium of Berlin was not then very rich in American Orchids and this must be my apology for the not very appropriate comparison with *P. tribuloides*.

XV.—NOTES ON SPECIES OF FUSARIUM AND SCLEROTIUM IN UGANDA.

W. Small.

The species of *Fusarium* discussed in these notes was reported in 1920 as the cause of a wilt of carnations, *Delphinium*, *Nigella* and *Cosmos*[1], and again in 1922 as a parasite of cashew-nut seedlings[2]. Its facultative parasitism of seedlings of the silky oak, rose apple and loquat, and its occurrence on *Antirrhinum* and carnation plants in association with *Heterodera radicicola* Greef were also discussed, and the morphology of the fungus was shown to resemble closely that of a species of *Fusarium* described fom India as a parasite of the pigeon pea (*Cajanus indicus* Spreng.)[3]. The Uganda fungus was afterwards proved to be pathogenic to the pigeon pea, and it was labelled provisionally *Fusarium udum* Butl., the name given to the Indian form. It had already been pointed out that the Uganda *Fusarium* was indistinguishable from a species causing a wilt of carnations in South Africa[4], and it had been concluded that it was capable of being aggressively or weakly parasitic or of existing in the soil as a mere saprophyte. The *Fusarium* having been found to cause a potato rot and to be associated with a wilt or foot rot of beans (*Phaseolus* sp.), further evidence of its activities, partly harmful and partly saprophytic, has been obtained, and it is the purpose of this paper to put the facts on record. It may be noted here that a form allied to *Fusarium udum* has been reported from Tonkin as the probable cause of a wilt disease of *Crotalaria juncea* [5], and it therefore seems as if the *Fusarium* under discussion, like others of its kind, has not only a wide geographical distribution but also a varied range of possible hosts. Weight is lent to this supposition by resemblances between the Uganda fungus and a *Fusarium* which causes a potato wilt and rot in India [6], and also by the likeness, independently noted in India and Uganda, between the respective species of *Fusarium* and *F. radicicola* Wr., a species known in Europe but described from the United States of America [7] where it occurred on decayed tubers and roots of the potato and also on *Ipomoea Batatas*, and where it is now held responsible for field rots of potatoes.

The *Sclerotium* of these notes is a new record for this part of Africa. The fungus was shown to be only a weak parasite, but its occurrence was not without interest.

Fusarium udum as the Cause of a Potato Rot.

Towards the end of 1923, several samples of rotted potatoes (*Solanum*) were sent to the writer from the Bugishu (Mt. Elgon)

[1] Small, *Kew Bull.* 1920, p. 321. [2] Small, *Kew Bull.* 1922, p. 269. [3] Butler, Mem. Dept. Agric. India, Bot. Ser., 2, No. 9, 1910. [4] Van der Bijl, Ann. Appd. Biol., 2, p. 267, 1915–16. [5] Rev. Appd. Mycology, 1, p. 294, Sept. 1922. [6] Ajrekar and Kamat, Agric. Jour. India, 18, p. 515, Sept. 1923. [7] Wollenweber, Jour. Agric. Res., 2, p. 251, July 15, 1914.

district of Uganda. The potatoes had been grown by natives and were dug from the ground in a diseased condition. The symptoms of the rot were a general softening of the tubers, a wrinkling of the skin, and an internal brown discolouration. The last seemed to be extensive rather than confined to a particular part of the tuber, and the advanced stages of the rot were characterised by a watery decay, an offensive smell, and the presence of a rod-shaped non-flagellate bacterium. The only organism present in the earlier stages of the rot proved to be a species of *Fusarium* which was isolated both from hyphae and conidia which appeared upon infected tubers in a damp-chamber and from fragments of diseased tissue. The same *Fusarium* having been found on the skin of an apparently sound potato taken from a domestic supply for experimental purposes, the latter of those two sources was considered more reliable than the former and was accordingly employed. At the same time, a careful search for the presence of other species of *Fusarium* was made, but none was found. The *Fusarium* was duly grown in culture, and a study of the morphology of its conidiophores and conidia and of the colouration of its conidial masses showed that it was, morphologically, none other than the species of *Fusarium*, the Uganda and other hosts of which have already been mentioned.

As it was considered desirable to extend the culture work on the *Fusarium* for purposes of comparison, it was grown on the media originally employed by Butler in India and repeated by the writer in Uganda[1], and it was found to resemble the previous form in macro- and micro-characteristics. In fact, the behaviour of the fungus in these cultures was remarkably similar to that reported in 1922. As regards the fungus on diseased tubers, it may be noted that the only points of distinction between its present and its past appearances were the absence of the large seven-septate conidium found on diseased cashew-nut seedlings and of the sturdy three-septate spore associated with the *Fusarium* as it was recovered from inoculated plants of *Spondias lutea*, but, as both these forms of conidia were regarded as the outcome of temporary abnormal conditions of growth rather than as regular morphological features, little diagnostic value was attached to them.

The pathogenicity of the fungus towards wounded potato tubers was tested under all precautions, and it was found that the *Fusarium* was capable of reproducing the potato rot in the space of about four weeks. The rot resembled the natural rot in every way, and, in addition, it was noted that in some cases the discoloured areas extending through the tubers from the points of inoculation were edged with a band of a darker shade of brown than the remainder of the discolouration. The *Fusarium* was duly recovered from the inoculated potatoes. During these experiments the inoculated potatoes showed a greater tendency than the controls to throw out sprouts which died off as the

[1] *Kew Bull.* 1922, p. 287.

rot advanced. At the same time, it was proved that the *Fusarium* was unable to penetrate the unbroken skin of sound potatoes or to force an entrance by the "eyes." It was likewise shown that the fungus behaved in the same manner towards sweet potatoes (*Ipomoea Batatas* Poir.); that is to say, it produced a soft brown rot through the broken skin only. The inoculum used in these experiments took the form of a suspension of viable conidia in sterile distilled water or of small blocks of agar medium containing active mycelium, and the precautions observed were successful enough to prevent the appearance of bacteria on the rotting potatoes.

It therefore seemed clear that the *Fusarium* was capable of causing a rot of potatoes under certain laboratory conditions, but this fact did not throw any light upon the conditions under which the fungus became destructive in the field. The length of time required to produce the experimental rot and the necessity for a wound entrance pointed to such a weak parasitism on the part of the *Fusarium* that the field rot might have been merely a storage trouble, but, again, the reputed percentage of diseased tubers in the field, namely seventy-five, was so large that the presence of another factor might have been expected. Field observations were therefore required, and further experiments were carried out, in order to ascertain whether the rot was preceded or accompanied by other disease, for example, a wilt. Potatoes were grown in inoculated soil, and potatoes previously inoculated with *Fusarium udum* were planted out. Again, the fungus in the form of a spore-suspension was introduced into stem and root wounds and was sprayed upon the leaves of healthy plants, the latter being kept under bell-jars for forty-eight hours after inoculation. As the plants of these experiments grew in a normal manner and gave no sign of being affected by the treatment accorded them, it seemed that the *Fusarium* was unable to cause a potato wilt, and this conclusion was supported by a report from the field to the effect that there was no wilt in association with the rot. The potato rot was therefore regarded as a storage rot due, primarily, to delay in removing the potatoes from the ground, and, secondarily, to the presence of a fungus of wide distribution.

Sclerotium bataticola and Fusarium udum associated with a Wilt or Foot-rot of Beans.

While the study of the potato rot outlined above was in progress, a wilt of beans (*Phaseolus* sp.) was reported. The disease was characterised by an external brown discolouration and a softening of the stems near ground level, and the collapse of affected plants was very rapid. Investigation disclosed the presence on wilted plants of no fewer than five fungi, viz., *Sclerotium bataticola* Taub., *Sclerotium Rolfsii* Sacc., a *Fusarium* indistinguishable in nature and in culture from that of the potato rot and therefore labelled *Fusarium udum*, a second *Fusarium*,

and a species of *Colletotrichum* (*Gloeosporium*) resembling that which occurs in Uganda on coffee branches, cacao twigs and pods[1], ripe oil-palm nuts, vanilla leaves, avocado pear and mango twigs, and other parts of several other plants.

Of these fungi, the first-named was most consistent in its presence on diseased material; it also occurred in the form of mycelium and sclerotia in the hollows caused by the wilt in the discoloured lower portions of the stems of affected plants. *Sclerotium Rolfsii* was present so seldom that it was considered likely to be only a saprophyte. *Fusarium udum*, again, occurred on about 50 per cent. of the wilted plants and was also present to a slight extent in the stem and root tissues in the form of hyphae bearing typical chlamydospores, but it differed from *Sclerotium bataticola* inasmuch as its presence could not be detected until after damp-chamber treatment of the material from the field. Its appearance, moreover, was invariably later than that of *Sclerotium bataticola*. The second *Fusarium* was new to the writer's experience and did not occur frequently, while the *Colletotrichum* was found on only a few plants on which there was no sign of an anthracnose such as is caused in Uganda, as elsewhere, by *Colletotrichum lindemuthianum* (Sacc. and Magn.) Br. and Cav.

The above five fungi were isolated and grown in pure culture on solid media; *S. bataticola* was also found to grow luxuriantly on filter paper moistened with sugar solution. The series of cultures employed in the study of the potato rot *Fusarium* was repeated with the bean strain of *F. udum*, and the fungus was found to be morphologically indistinguishable from the strain derived from the potato rot. Evidence of the physiological identity of the two strains was provided by the results of potato inoculation experiments which showed that the bean strain of the *Fusarium* could cause potato and sweet potato rots by the same method, in the same time, and of the same nature as the potato strain. It may be added that the second *Fusarium* was proved to be non-pathogenic to potatoes; in fact, its meagre growth on potato plugs showed them to be an unsuitable medium for that fungus.

The pathogenicity of all five fungi towards beans was tested in a series of soil inoculations in tins of young and healthy plants which were placed in two rows, one being used as a control to the other. In these experiments, no effort was made by root-wounding or by forced contact between fungus and intended host to ensure an intimate relationship between them, and the tins of plants were kept out of doors under natural conditions. The inoculum took the form of fragments of agar cultures containing active elements of the various fungi and of pieces of potatoes on which the fungi, especially *Sclerotium bataticola* and *Fusarium udum*, were growing, and it was used in comparatively large quantities. With a view to employing a more natural medium, efforts were made to grow the fungi on sterilised pieces

[1] Small, *Kew Bull.* 1921, p. 57.

of decaying banana leaves such as are found in the soil of this country, but they met with no success.

The *Sclerotium bataticola* experiments were the first and only ones to provide results of a positive nature. The plants in the inoculated areas of the tins yellowed and wilted, and complete collapse followed in fifty days, a much longer period of time than that required by the fungus in the field. The results were very striking, inasmuch as the control plants of these experiments remained healthy and ripened their fruit. The symptoms of the experimentally-produced wilt were the same as those of the original disease, and the fungus was recovered from all the wilted plants. Of the other fungi associated with the wilt, only the *Colletotrichum* appeared on one or two of the plants. On the other hand, *Sclerotium Rolfsii*, *Fusarium udum*, *Fusarium* sp. and the *Colletotrichum* proved to be non-pathogenic, although the experiments were repeated and the number of those in which *Fusarium udum* was involved was further duplicated in order to give the fungus every opportunity, so to speak, of parasitising the beans. *Sclerotium Rolfsii* has been shown to be a virulent parasite of many plants in America and other parts, but its occurrences in Uganda have suggested that it is inclined towards saprophytism rather than parasitism. The above-recorded results seem to support that view.

The bean wilt, therefore, was to be attributed in a certain narrow sense to *Sclerotium bataticola*, a fungus which (under the names of *Rhizoctonia* sp. and *R. solani* Kühn) was already known as a parasite of many plants in India, including species of *Phaseolus*[1]. It also occurs on cotton in Egypt, and is the cause of a sweet potato charcoal rot in America. The last-mentioned disease is largely one of storage, and the *Sclerotium* is said to be a common soil saprophyte. It may exist under similar conditions in this country, for its sudden appearance and virulence were undoubtedly influenced by the long spell of hot dry weather during which the wilt broke out. When further plantings of the same species of beans were made in the area from which the diseased plants were derived, without treatment of the soil and during the rains which succeeded the dry spell referred to, that is, under conditions distinctly more favourable to growth, it was found that the deaths of the few plants which did not come to maturity were not due to *Sclerotium bataticola*, or, in fact, to fungus attack at all. The operation of similar conditions explains why experimental infection and collapse were brought about more slowly than in the field, for the laboratory plants were carefully watered and tended. The present case, therefore, appears to be an illustration of the view that the primary factor in certain outbreaks of plant disease is not the presence of even a dangerous fungus but rather the influence of environment on the vitality of the host plant, and, further, it seems to show that the

[1] Shaw and Ajrekar: Mem. Dept. Agric. India: Bot. Ser. 7, No. 4, 1915.

influence of external conditions on the present host was of greater significance than their influence on the parasite. As far as could be judged by its vigour in culture, the growth of the *Sclerotium* was unaffected by changes in temperature corresponding to those taking place in the soil.

The conclusion that *Fusarium udum* fulfilled a secondary and unimportant role in the causation of the bean wilt seemed to be strongly supported by the results of the inoculation experiments, but it was shown by direct-infection experiments that the fungus was capable of causing the death of young plants. The method used was that of Rathbun[1]. Bean seedlings were sprouted in damp filter paper and were introduced into four-day-old petri-dish cultures of both strains of *Fusarium udum*. At the same time, similar seedlings were exposed to infection by *Sclerotium bataticola* by the same method. The young roots of the control seedlings were exposed to contact with uninoculated medium only. After six days, a period which seemed sufficient to ensure infection, all the seedlings with the exception of those that were contaminated were planted out. The roots of those in contact with the *Fusarium* were then covered with mycelium and were stained a pale brown, while those in contact with the *Sclerotium* were blackened. After a few days, the supposed *Fusarium*-infected seedlings had made good growth and had proceeded to unfold their cotyledons and first leaves, but, in two weeks' time, half of them, distributed, as regards treatment, almost equally between the two strains of the *Fusarium*, had wilted and collapsed. Only *Fusarium udum* was recovered from the dead plants. The other *Fusarium*-treated plants continued to grow, but with less vigour than the controls. The *Sclerotium*-infected plants, on the other hand, appeared above the soil to the extent of only thirty per cent. of the total number of seedlings, and they wilted when only one inch in height. Only *Sclerotium bataticola* was recovered from them. These experiments showed even more clearly than the soil-inoculations that *Sclerotium bataticola* was at least a facultative parasite of beans, and also that, under the severe conditions imposed, *Fusarium udum* was a possible parasite of the same plant.

It has been mentioned that both the potato and bean strains of *Fusarium udum* were proved to cause a rot of wounded potatoes. It was also found that the potato strain, like that of the bean, was not capable of causing bean disease when tested with plants in tins but was pathogenic when given an intensive opportunity by the direct-inoculation petri-dish method already reported. Further, results were negative when two former hosts of the fungus, seedlings of cashew-nut and *Grevillea robusta*, were tested in soil inoculations with both strains. It was concluded, therefore, that neither strain of the *Fusarium* was really pathogenic under natural conditions. This conclusion involved the further one that the potato *Fusarium* occurred merely as a saprophyte,

[1] Phytopathology, 11, p. 82, Feb. 1921.

albeit a harmful one, and support was lent to this view by the failure of both strains to penetrate the "eyes" or unbroken skin of potatoes or to cause a potato wilt, and by the absence of wilt in the field. The strains were apparently weak when confronted with unwounded potatoes or with healthy beans, a condition which was surprising when regarded from the point of view of the proved capabilities of the fungus for parasitism under certain conditions, but which falls, nevertheless, into line with its known habits. The present occurrences of *Fusarium udum*, however, show how widely spread the fungus is in this country, and they indicate that its presence is a danger, for there is no doubt that it can become a destructive organism in circumstances favourable to itself and unfavourable to its host. In other words, its pathogenicity depends less on the strain of the fungus and the presence of a possible host plant than on the environmental conditions under which the fungus comes into contact with its host. It is hoped that further cases of suspected *Fusarium* infection on new hosts will occur from time to time, so that the continued study of its relations with its various substrata will throw more light upon its biology in this country.

Taxonomic Notes.

During the course of the work reported in the preceding pages there was no doubt in the writer's mind as to the identity of the potato and bean Fusariums with each other, with the form previously studied in Uganda, and with the Indian *Fusarium udum*. Identification was based upon morphological and cultural comparisons, and it seemed adequate even in dealing with a genus like *Fusarium*, the species of which are imperfectly demarcated one from another and are liable to show variations of a minor kind. From a certain point of view, it would have been more securely founded if morphological likeness had been supported by an equal pathogenicity, but, from another point of view, there is little reason why the former should imply the latter. It is apparent that the fungus here referred to as *F. udum* retains and regularly reproduces certain morphological features which are independent of its different natural or artificial habitats, and which are so constant that they may be adopted as criteria on which identification can be based. They include mycelial colours, the nature of the conidiophores, the presence of microconidia, the size, shape, septation and occurrence of the macroconidia, the presence and the nature of the chlamydospores, and the colouration and presence of the conidial masses (pseudopionnotes derived from the coalescence of sporodochia). These various points have been described in previous papers in which accounts of *Fusarium udum* in nature and on various media have been given, and it seems unnecessary to repeat them here, but emphasis may be laid on the constant nature and dirty- or creamy-yellow colour of the pionnotes. When these criteria are applied to the Indian potato wilt and rot *Fusarium*, there can be noted many points

of resemblance between the Indian and Uganda forms. Morphologically they are similar, and their temperature relations agree; physiologically, however, they differ in their host relations, although the types of potato rot produced by them are alike. Similarly, there are many points of morphological resemblance and at least one of physiological difference between *F. radicicola* and the Uganda *F. udum*. The latter is founded on the ability of *radicicola* and the inability of *udum* to penetrate the unbroken skin of tubers and on differences in the types of rots produced, but these points cannot be stressed because the experimental work was not carried out with the same varieties of potatoes. Morphologically, *Fusarium udum* in Uganda differs from *Fusarium radicicola* in U.S.A.[1] in having in culture a smaller percentage of 4-septate and a larger percentage of 5-septate conidia, in the greater proportionate breadth of its conidia and in the presence of typical pseudopionnotes. On the other hand, *F. udum*, when grown on potato plugs and rice for colour comparisons, was found to resemble closely the details given by Carpenter for *F. radicicola* [2]. In order to make further comparisons, the writer obtained from the Centraalbureau voor Schimmelcultures a culture of *F. radicicola* and transferred the fungus to the media on which he had grown *F. udum*, but a comparison of the two forms showed that they were quite distinct from each other. The *F. udum* of these notes is also distinct from *F. udum* (Berk.) Wr. and from Sherbakoff's variety *solani* of the species [3], and, while it resembles *F. striatum* in many points, particularly in the typical presence of pseudopionnotes, it remains nearer to *F. radicicola*. The identification of species of *Fusarium* is well-known to be a matter of great difficulty, and workers with the genus should welcome the suggestions of Morris and Nutting [4] for the standardising of methods of dealing with it. The recent work of Brown and Horne [5] has shown that types may arise within a morphological species and has emphasised the necessity for a careful account of normal growth under specified conditions.

There seemed to be no doubt concerning the identity of *Sclerotium bataticola*. It corresponded closely with a fungus labelled *Sclerotium bataticola* Taub. which came into the possession of the writer through the Imperial Bureau of Mycology in the form of an isolation from cotton in Egypt. At a later date, the Bureau kindly provided cultures of an Indian fungus which, under the name of *Rhizoctonia* sp. [6], was known to attack cotton, cowpea, groundnut and other plants, and which was referred to *Rhizoctonia solani* Kühn by Shaw [7] and to *S. bataticola* by the Bureau, and also of an American *S. bataticola* isolated at the Bureau from sweet potato charcoal rot material provided by

[1] Wollenweber, loc. cit. p. 257. [2] Jour. Agric. Research, 5, p. 183 (plate A), Nov. 1, 1915. [3] Sherbakoff, Fusaria of potatoes, Cornell Univ. Agric. Exper. Stn. Memoir No. 6, May, 1915. [4] Jour. Agric. Research, 24, p. 339, April 28, 1923. [5] Annals of Botany, 38, p. 379, April, 1924. [6] Butler, Fungi and disease in plants, 1918. [7] Mem. Dept. Agric. India: Bot. Ser. 7, No. 4, 1915.

Taubenhaus. These three fungi of different origins were morphologically indistinguishable, and the writer found that his bean wilt fungus agreed so closely in detail with all of them that it could safely be labelled *Sclerotium bataticola*. At the same time, it was decided to test the ability or otherwise of the four strains of the fungus to cause Taubenhaus' charcoal rot of sweet potatoes, so that the above determinations might be placed on a firmer basis if the results warranted that step. The experiments were conducted with wounded and unwounded sweet potatoes which were carefully surface-sterilised, and they were repeated three times in order to obtain conclusive results. The four strains were grown on the same medium (glucose lemco agar + 10) and under the same conditions, and the inoculum used consisted of small fragments of medium containing hyphae and sclerotia of the same ages. It was found that neither of the four strains could penetrate the unbroken skin of the sweet potato, but that all four could cause a rot that agreed with Taubenhaus' charcoal rot in every way[1]. The times required to transform the healthy sweet potato tissue into what Taubenhaus calls " a black charcoal mass caused by the formation of minute black sclerotia " varied from forty to sixty days. It seemed, therefore, that there was every justification for assigning the Uganda bean wilt fungus to *Sclerotium bataticola*, and, further, that the Indian forms which had been referred to the genus *Rhizoctonia* might be placed more properly in *Sclerotium* on stronger grounds than those of morphology alone.

XVI.—NEW LAURACEAE FROM SOUTHERN INDIA.

J. S. Gamble.

Cryptocarya anamalayana *Gamble* [Lauraceae]; *C. Wightianae* Thw. Ceylonensi, affinis, foliis majoribus et paniculis eximie bracteatis differt; *C. Griffithianae* Wight, Malayensi, etiam affinis sed foliis tenuioribus et reticulatione foliorum diversa differt.

Arbor insignis, ramulis inflorescentia et foliis subtus ad nervos fulvo-tomentosis. *Folia* elliptica vel obovata, apice obtusa sed subito breviter acuminata, basi obtusa vel cuneata supra praeter nervos glabra lucida, subtus subglauca et ad nervos et nervulos fulvo-tomentosa, ad 20 cm. longa, 10 cm. lata; nervi primarii utrinque 8–10, nervuli prominentes reticulati subparalleli sed transversim reticulatione conspicua juncti; petiolus brevis, vix 1 cm. longus. *Flores* in cymarum paniculis brevibus axillaribus et lateralibus fulvotomentosi, bracteis et bracteolis oblongis munitis; paniculae vix 3 cm. longae pedicellis vix ullis. *Fructus* ignotus.—*C.* sp. Hook.f. in Fl.Br.Ind.v.121.

S. India. Anamalai Hills, at about 1000 m. alt., *Beddome* 270; Punachi, May 1903, *C. A. Barber* 6008.

[1] The culture and diseases of the sweet potato, Dutton and Co., 1923, p. 159.

Cryptocarya Beddomei *Gamble* [Lauraceae] ; species distincta foliorum reticulatione haud conspicue areolata, nervis primariis distantibus.

Arbor ramulis fulvo-pubescentibus ut etiam inflorescentia et foliorum costa. *Folia* elliptica vel ovata, chartacea, apice obtusa vel subito breviter obtuse acuta, basi rotundata vel truncata, supra lucida, subtus siccitate purpureo-glaucescentia, ad 14 cm. longa, 6 cm. lata ; nervi primarii distantes utrinque 6–8, supra impressi ; nervuli transversi etiam distantes pauci ; reticulatio haud conspicue areolata ; petiolus 1 cm. longus, crassus. *Flores* minuti, in paniculis fulvo-pubescentibus axillaribus vel lateralibus ad 9 cm. longis, pedunculis 3 cm. longis, pedicellis brevibus ; bracteae oblongae, curvatae, 3 mm. longae, deciduae, ut bracteolae minutae. *Stamina* ordinis primi et secundi connectivo producto acuto, tertii obtuso, filamentis brevibus villosis, staminodia satis magna. *Fructus* adhuc ignotus.

S. India. Plains of S. Canara, *Beddome ;* Udumanparai, Anamalai hills, April 1903, *C. A. Barber* 5731.

Cryptocarya Bourdillonii *Gamble* [Lauraceae] ; species insignis magnitudine foliorum saepe quam 20 cm. longitudine et 10 cm. latitudine majorum, baccis globosis circiter 10–15 mm. diametro.

Arbor magna, foliis persistentibus, ramulis ultimis et inflorescentia fulvo-pubescentibus. *Folia* chartaceo-coriacea, oblongo-elliptica, apice abrupte obtuse acuminata, basi rotundata, 10–20 cm. longa, 5–10 cm. lata, subtus purpureo-glauca ; nervi primarii utrinque 9–12, paralleli, nervulis vix prominentibus multis parallelis juncti ; reticulatio areolata ; petiolus crassus 10–15 mm. longus. *Flores* minuti in paniculis patentibus axillaribus vel lateralibus circiter 10–12 cm. longis, pedunculis et pedicellis gracilibus ; bracteae et bracteolae parvae, cito deciduae. *Stamina* connectivo apice producto, filamentis villosis ; staminodia magna. *Bacca* globosa, glabra, nigra, 10–15 mm. diametro.—*C. Wightiana* Hook.f. in Fl. Br. Ind. v. 120 *in part, not of* Thw.

S. India. Evergreen forests of Travancore, Colatoorpolay, about 150 m. alt., 1894 to 1896, *T. F. Bourdillon* 384, 385, 851 ; South Tinnevelly, 1200 m., *Beddome* 23 ; Yellapur Ghâts in North Kanara, March 1883, *W. A. Talbot* 2879 ; Tandigudi, Lower Pulney hills, June 1901, *Sir A. G. and Lady Bourne* 1453 (evidently from young trees or coppice shoots, the leaves reaching to 34 cm. long, 16 cm. broad) ; also, probably, Memankolli, Coorg, *W. F. Perrée* in Herb. Calc.

Cryptocarya Lawsonii *Gamble* [Lauraceae] ; *C. Bourdillonii* Gamble affinis, foliis minoribus angustioribus vix 12 cm. longis obtusis vel paullo acutis ; bacca ovoidea ad 3 cm. longa 15 mm. diametro saepe lenticellata.

Arbor elata, foliis persistentibus, ramulis glabris lenticellatis nigris. *Folia* oblonga vel oblongo-lanceolata, apice obtusa, emarginata vel paullo acuta, basi acuta, 7–12 cm. longa, 3–4 cm.

lata, supra glabra, subtus purpureo-glauca; nervi primarii utrinque 6–8, curvati; nervuli transversi; reticulatio areolata; petiolus 10–12 mm. longus, crassus. *Flores* minuti, in paniculis brachiatis terminalibus vel axillaribus ad 9 cm. longis parce fulvo-puberulis, pedunculis et pedicellis gracilibus; bracteae et bracteolae parvae, cito deciduae. *Stamina* ordinis primi connectivo apice producto, secundi et tertii obtuso; staminodia magna. *Bacca* ovoidea, longitudinaliter sulcata, nigra, saepe lenticellata, ad 35 mm. longa, 20 mm. lata.

S. India. Sholas about Avalanché and Sispara, Nilgiris, about 2000 m. alt., *M. A. Lawson; Gamble* 14263, 14470, 20593, 20683: Anamalai hills, *Beddome*; Tinnevelly Ghâts, *Beddome* 190.

Cinnamomum riparium *Gamble* [Lauraceae]; *C. gracili* Hook. f. affinis, foliis lineari-lanceolatis angustioribus ita conspicue transversim non reticulatis, floribus majoribus, griseo-pubescentibus differt.

Arbor parva, ramulis nigris gracilibus glabris. *Folia* lineari-lanceolata, apice acuminata, basi acuta, glabra, e basi tricostata, nervulis multis irregularibus haud conspicuis, 6–10 cm. longa, 1–3 cm. lata; petiolus gracilis, niger, ad 1 cm. longus. *Flores* pauci, 3–7, in cymis e ramulis ultimis axillaribus, corymbosis vel subumbellatis; pedunculi graciles circiter 4 cm. longi, pedicelli etiam graciles, 7–15 mm. longi. *Perianthium* griseo-pubescens, 5 mm. longum. *Stamina* filamentis villosis, ordinis tertii glandulae e medio filamentorum stipitatae; staminodia stipitata. *Ovarium* glabrum. *Fructus* ignotus.

S. India. Banks of the Periyar River in N. Travancore, *T. F. Bourdillon* 710, 1573, Dec. 1895, 1904; foot of the Coorg Ghâts, in river beds, *Beddome*; Udumanparai, Anamalais, Nov. 1901 and May, 1903, *C. A. Barber* 4103, 5852.

Cinnamomum travancoricum *Gamble* [Lauraceae]; *C. gracili* Hook. f. affinis, floribus fulvo-sericeis, foliis subtus fulvo-villosis, nervulis transversis distantibus haud eximie reticulatis differt.

Arbor mediocris, ramulis teretibus pustulato-lenticellatis, ultimis fulvo-pubescentibus. *Folia* ovata, apice acuta vel acuminata, basi acuta, supra glabra, subtus fulvo-pubescentia demum glabra, tricostata, 5–8 cm. longa, 2–3·5 cm. lata; nervuli distantes, obscuri, nervi e costis lateralibus patentes; petiolus gracilis, 5–10 mm. longus. *Flores* pauci, 3–7, in racemis axillaribus vel lateralibus brevibus fulvo-sericeis; pedunculi graciles, 1–3 cm. longi, pedicelli brevissimi. *Perianthium* fulvo-sericeum, 5–7 mm. longum, lobis ovatis. *Stamina* filamentis extus villosis; ordinis tertii glandulae e basi filamentorum stipitatae; staminodia longe stipitata. *Ovarium* glabrum. *Fructus* ignotus.

S. India. Evergreen forests near Chimanji, Travancore, about 1200 m. alt., April 5th 1895, *T. F. Bourdillon* 545.

Actinodaphne Bourneae *Gamble* [Lauraceae]; *A. Hookeri* Meissn. var. *dasypodae* affinis sed foliis rufo-villosis minoribus non ita conspicue triplinerviis, subtus haud glaucis differt.

Arbor ramulis ultimis molliter fulvo-tomentosis. *Folia* chartacea, verticillata, elliptica, breviter acuminata, basi cuneata, subtus et supra ad costam fulvo-tomentosa, 6–12 cm. longa, 3–5 cm. lata, subtriplinervia, nervis utrinque circiter 5 conspicuis, nervulis transversalibus parallelis multis ; petiolus crassus, 10–15 mm. longus. *Flores* in umbellis bracteatis axillaribus vel lateralibus fulvo-tomentosis. *Perianthium* ♂ breve, lobis 5 ovatis obtusis, ♀ ignotum. *Stamina* filamentis basi solum villosis ; ordinis tertii glandulis ad mediam partem ornata. *Ovarium* glabrum. *Fructus* ignotus.

S. India. Pulney Hills, in Kodaikanal Shola, June 1897, *Sir A. G. and Lady Bourne* 517.

Actinodaphne Bourdillonii *Gamble* [Lauraceae] ; species insignis ; foliis longis conspicue ad apices ramulorum verticillatis ; florum ♂ umbellis magnis eximie bracteatis, ♀ etiam umbellis magnis multifloris pedunculatis distincta.

Arbor ad circiter 10 m. alta, ramis crassis griseis puberulis, ramulis ultimis etiam crassis fulvo-tomentosis, innovationibus fulvo-sericeis, perulis ovatis obtusis. *Folia* ad 7–10 verticillata, chartacea, oblongo-lanceolata vel oblanceolata, apice longe acuminata, basi longe attenuata, supra costa excepta glabra, subtus molliter lanitie cinnamomeo-vel griseo-tomentosa, 16–24 cm. longa, 4–6 cm. lata ; nervi utrinque 12–14 conspicue obliqui, supra impressi, nervulis transversalibus satis obscuris ; petiolus crassus, fulvus, 5–15 mm. longus. *Flores* in umbellis e ramulis penultimis lateralibus magnis bracteatis fulvo-sericeis multifloris ; bracteae orbiculares, obtusae, fere 1 cm. latae, caducae. *Perianthium* ♂ breve, lobis ovatis acutis fulvo-sericeis ; ♀ fructifer cupulare, fere glabrum, 5–6 mm. diametro, lobis deciduis. *Stamina* filamentis elongatis fulvo-sericeis. *Bacca* fere globosa, nigra, 5 mm. diametro.

S. India. Hills of Travancore, 200–1200 m. alt., in evergreen forest, *T. F. Bourdillon* 19, 37, 504, (small tree 19, 37 ; large tree 504) ; S. Canara, forests, *Beddome* ; Iyerpadi, Anamalai hills, April 1903, *C. A. Barber* 5469 ; Lord Hobart's road, Nilgiris, 2000 m. alt., June 1883, *J. S. Gamble* 11800.

Bourdillon says the young leaves are quite white. One fruiting umbel had 14 pedunculate cupules !

Actinodaphne Lawsonii *Gamble* [Lauraceae] ; *A. Bourdillonii* Gamble affinis, foliis obovatis fere obtusis, nervulis transversis conspicuis distincta.

Arbor ramulis ultimis molliter rufo-tomentosis. *Folia* ad 7 vel plura verticillata, chartacea, obovata, apice obtusa vel obtuse acuta, basi attenuata, supra nervis et costa exceptis glabra, subtus glauca et praecipue ad nervos rufo-tomentosa, 10–14 cm. longa, 4–6 cm. lata ; nervi utrinque 8–10 saepe ramulosi, nervulis transversalibus conspicuis subparallelis ; petiolus crassus, rufo-tomentosus, 15–20 mm. longus. *Flores* (♀ fructifer tantum notus) in umbellis 6–8-floris lateralibus pedunculatis rufo-tomentosis ;

pedicelli 1 cm. longi ; perianthii cupula ad 5 mm. diametro, lobis deciduis.

S. India. South-East Wynaad, Nilgiris, about 1500 m. alt., *M. A. Lawson* 1884 ; also, probably, *C. B. Clarke* 11079 from Coonoor Nilgiris, leaves only, a large tree !, the leaves obovate, thinner, 24 cm. by 10 cm.

Actinodaphne Tadulingami *Gamble* [Lauraceae] ; *A. hirsutae* Hook. f. affinis, foliis latioribus, nervis et nervulis magis conspicuis, pedunculis fructiferis brevioribus distincta.

Arbor ramulis teretibus fulvo-pubescentibus. *Folia* ad 5 verticillata, submembranacea, elliptico-lanceolata, apice acuminata, basi cuneato-attenuata, supra glabra, subtus praecipue ad nervos et costam fulvo-villosa, pallida, 10–25 cm. longa, 4–8 cm. lata ; nervi utrinque 10–15, curvati et marginem versus arcuatim juncti, nervulis transversis prominentibus subparallelis ; petiolus crassus, 10–20 mm. longus, fulvo-tomentosus. *Flores* in umbellis parvis sessilibus ad ramulos ultimos lateralibus ; bracteae orbiculares fulvo-sericeae. *Perianthium* ♂ et ♀ breve, lobis oblongis intus glabris, extus villosis. *Stamina* floris ♂ et staminodia floris ♀ filamentis fulvo-villosis. *Ovarium* fulvo-villosum. *Bacca* ovoidea, glabra vel paullo pubescens, in cupulam glabrescentem 4 mm. longam insidens, pedicellis 1 cm. longis.

S. India. Tinnevelly District, Mundanthorai to Kannikatti, March 1917, *C. Tadulingam* 14640 ; Anamalai Hills, *Beddome* ; Murchison Estate, Travancore, 700 m. alt., *M. A. Lawson* Dec. 1893.

W. India. Canara, *Stocks* (*A. Hookeri* var. *rufescens* fide Meissner in Herb. Kew.).

Litsea mysorensis *Gamble* [Lauraceae] ; *L. coriaceae* Hook. f. affinis, foliis angustioribus acuminatis, umbellulis sessilibus perpaucis axillaribus vel lateralibus differt.

Arbor ramulis gracilibus teretibus. *Folia* anguste lineari-lanceolata, apice acuminata, basi attenuata, siccitate viridia, chartacea, supra glabra, infra vix conspicue reticulata, 6–12 cm. longa, 10-25 mm. lata ; petiolus brevis, vix 5 mm. longus. *Flores* in umbellulis parvis sessilibus, bracteis orbicularibus 3 mm. latis extus sericeis, intus glabris, circiter 5 in quoque umbellulo ; perianthii lobi 6, oblongi extus sericei, ♀ quam ♂ paullo minores. *Stamina* in flore ♂ 9, filamentis glabris ; in flore ♀ staminodia exteriora subulata, interiora parva glandulis 2 munita. *Ovarium* ovatum glabrum, stylo crasso, stigmate capitato reflexo. *Fructus* ignotus.

S. India. Bisli Ghàt and Aglatti, Mysore, about 1000 m. alt., Nov. 1908, *A. Meebold* 4921, 4979 ; Wynaad, Malabar, *Beddome*.

Litsea insignis *Gamble* [Lauraceae] ; *L. polyanthae* Juss. affinis, sed foliis multo crassioribus, floribus e tuberculis lateralibus et fructu cum cupula multo majore differt. *L. grandi*

Hook. f. specie malayensi etiam maxime affinis praecipue fructu multo majore et nervulis transversis foliorum magis distantibus differt.

Arbor excelsa, ramis et ramulis crassis fulvo-rugosis lenticellatis flores gerentibus. *Folia* coriacea, elliptico-oblonga vel obovata, apice obtusa, basi obtusa vel paullo acuta, supra costa et nervis exceptis glabra, subtus fulvo-tomentosa vel vetustate glabrescentia, 12–20 cm. longa, 6–10 cm. lata; costa conspicua crassa; nervi utrinque 10–12 supra impressi; nervuli transversi paralleli circiter 4–5 mm. distantes; petiolus crassus 10–12 mm. longus. *Flores* in umbellulis multis subsessilibus ad axillas foliorum vel foliorum delapsorum conferti, pedunculo communi crasso tuberculam simulante; bracteae orbiculares, fulvae; flores in umbellulis 6–7; perianthii lobi obovati, fulvo-sericei, ad 3 mm. longi. *Stamina* in floribus ♂ 9, filamentis sericeo-villosis longis, interioribus glandulis pedicellatis munitis; staminodia in ♀ nondum visa. *Fructus* ellipsoideus, 2·5–3 cm. longus, 1·5–2 cm. diametro, glaber; in cupulam magnam incrassatam extus tuberculatam fere 2 cm. diametro insidens, pedicellis angularibus incrassatis.

S. India. Evergreen forests of Travancore, Periyar about 900 m., Ariyankava, about 300 m. alt., July and Sept. 1898, *T. F. Bourdillon* 1009, 1046; Anamalai hills at Sirikunru, Paralai and Iyerpadi, 1901 to 1908, *C. A. Barber* 4064, 5461, 5783, 8473.

Litsea Bourdillonii *Gamble* [Lauraceae]; species eximia, *L. polyanthae* Juss. paullo affinis foliis magnis obovatis multinerviis et umbellulis sessilibus insignis.

Arbor mediocris, ramulis pallidis crassis ultimis fere nigro-tomentosis. *Folia* coriacea, obovata, apice obtusa vel subito acumine parvo brevi munita, supra glabra siccitate viridia, subtus praecipue ad costam et nervos fulvo-puberula, 10–20 cm. longa, 5–11 cm. lata; costa conspicua; nervi utrinque 10–18, supra impressi, subparalleli; nervuli transversi subparalleli, distantes; petiolus crassus, 1–2 cm. longus, fusco-pubescens. *Flores* in umbellulis sessilibus ad axillas foliorum vel foliorum delapsorum confertis; bracteae orbiculares 4, fulvo-sericeae; flores in umbellulis 4–6; perianthii tubus ♀ 3 mm. longus; lobi ♂ et ♀ 6, oblongi, sericei; stamina et staminodia filamentis glabris. *Ovarium* ovatum, stylo crasso, stigmate peltato. *Fructus* oblongus vel obovoideus glaber, 15 mm. longus, 6 mm. diametro, in cupulam obconicam margine profunde fissam pubescentem insidens, pedicello incrassato perbrevi.

S. India. Travancore hills, in evergreen forest, 1000 m. alt., 1887 to 1898, *T. F. Bourdillon* 18, 57, 61, 447, 507, 569, 948; 1500 to 1700 m. alt., Peermade and Udambansholay, Dec. 1910, *A. Meebold* 12880, 13242; Munaar, 1500 m. alt., May, 1915, *K. Venkoba Row* 3269; Tinnevelly District, Kannikatti, 800 m. alt., Feb. 1913, *Hooper and Ramaswami* 39407; Anamalai hills, Monica, Andiparai, etc., 1200 m. alt., 1901 to 1903, *C. A. Barber* 3912, 4002, 5968; April, 1914, *C. E. C. Fischer* 3721.

Litsea travancorica *Gamble* [Lauraceae] ; *L. Bourdillonii* Gamble affinis, foliis ramulorum ultimorum oppositis, nervis paucioribus arcuatis, fructu globoso differt.

Arbor ramis teretibus pallidis, ramulis ultimis ut etiam petiolis et foliorum costis ferrugineo-tomentosis. *Folia* subcoriacea, opposita in ramulis ultimis, alterna inferius, obovata vel oblonga, apice acuminata, basi obtusa, supra glabra siccitate viridia, subtus praecipue ad nervos fulvo-pubescentia et fere glauca, ad 18 cm. longa, 5 cm. lata ; nervi utrinque 8–12, prope marginem arcuatim juncti ; nervuli transversi pauci, irregulares ; petiolus brevis, ferrugineus, 5–10 mm. longus. *Flores* in umbellulis sessilibus ad axillas foliorum confertis, bracteis orbicularibus ferrugineis ; ♀ solum noti. *Perianthii lobi* ovati, sericei. *Staminodia* exteriora linearia ; interiora clavata, sed glandulis 2 ad basin munita. *Ovarium* ovoideum glabrum, stylo brevi, stigmate capitato. *Fructus* globosus, ad 1 cm. diametro, glaber, in cupulam obconicam margine dentatam villosam insidens.

S. India. Travancore hills, Colatoorpolay, Nov. 1893, *M. A. Lawson* ; April 1916, *K. Venkoba Row* 3581 ; Mankulam, March 1911, *K. Venkoba Row* 4081.

Neolitsea Fischeri *Gamble* [Lauraceae] ; *Litseae lanuginosae* Nees affinis, fructu globoso, foliis non verticillatis, ad costam et nervos fulvo-villosis, nervulis magis regularibus et gemmis perulatis globosis vel cylindricis differt.

Arbor ramulis crassis ultimis ut perulae et folia juniora conspicue fulvo-tomentosis, gemmae foliiferae strobiliformes vel globosae, 5 mm. diametro. *Folia* coriacea, elliptica vel elliptico-obovata, apice obtusa subito accuminata, basi angustata, supra glabra lucida costis et nervis prominentibus, subtus glauca et ad costas juventute fulvo-tomentosa, 12–16 cm. longa, 6–9 cm. lata ; costae 3, supra basin 10–15 mm. ortae, nervis e costa media utrinque 3–4, intra costas laterales et marginem circiter 5–7, nervulis transversis parallelis distinctis ; petiolus crassus, 2–3 cm. longus. *Flores* masculi solum sed imperfecte noti, bracteis perulatis tecti, in umbellulis sessilibus lateralibus ; in quoque umbellulo 5, perianthii lobis triangularibus villosis 4. *Stamina* 6, interdum, praecipue in floribus mediis, 9 vel 12, filamentis villosis ; pistilli rudimentum ovoideum. *Bacca* globosa vel obovoidea, glabra, 10–15 mm. longa, 10 mm. diametro perianthii tubo parvo insidens, pedicello brevi incrassato.

S. India. Anamalai Hills, Shemburuve, 2000 m. alt., May, 1912, *C. E. C. Fischer* 3405 ; Iyerpadi, Oct. 1901, *C. A. Barber* 3853 ; Devicolam, Travancore, above 2000 m. alt., Dec. 1910, *A. Meebold* 13695.

XVII.—CRITICAL NOTES ON TRINIDAD PLANTS.

(" St. George " Pacific Expedition, 1924.)

L. A. M. Riley.

The " St. George " dropped anchor off Port-of-Spain on the evening of May 25th, and sailed for Panama on May 31st. During this short stay I was able to make a small collection of plants comprising fifty-seven species, largely owing to the assistance of Mr. R. C. Marshall, the Conservator of Forests. Most of the collection was obtained in three localities exhibiting widely different types of vegetation, viz. :—the Arima Reserve, a typical rain-forest rising to an altitude of over 4,000 feet ; the low-lying ground in the neighbourhood of the Cumuto Road and the Aripo Savannah ; and the Mora Forest (*Dimorphandra Mora*) in St. Andrew, which is a good example of a pure forest-association, a type not often found in the tropics.

Small as the collection is, it includes at least three species hitherto undescribed, one being of a genus previously known only from the Guianas, Brazil and Peru, and one new variety. Flowering material was obtained of *Eugenia Baileyi* Britton, a species apparently not found hitherto except in a fruiting state. A species of *Vismia* collected on the Cumuto road proves to be *V. falcata*, recently described by Rusby from the Orinoco Delta. It had been gathered by previous collectors, but was erroneously identified with *V. ferruginea* H.B.K. in Grisebach's Flora. These results serve to indicate how incompletely the flora of Trinidad is known, especially when it is realized that, during the years 1921–24, no fewer than fifty-four species from Trinidad have been described as new by Dr. Britton in the Bulletin of the Torrey Botanical Club.

One of the chief difficulties connected with the identification of Trinidad plants is the absence not only of a " Flora of Trinidad " but of any enumeration of the floras of Venezuela and British Guiana, of which that of Trinidad is mainly an eastern and northern extension. Indeed the flora has little claim to be considered West Indian at all, for, except in the case of species of wide distribution, the island of St. Vincent may be regarded as the northern limit which it attains. Grisebach's Flora of the British West Indies, which may be considered as the only work dealing systematically with the flora of Trinidad as a whole, is unfortunately untrustworthy in many respects. His conception of species was wide, and his determinations were frequently inaccurate. In fact, in my list given below, out of fifty-one species mentioned by Grisebach, in eleven instances his determinations have required revision or correction. Hence the naming of the collection has involved a wholly disproportionate expenditure of time. It has been necessary to collate recent researches and, in many cases, to determine herbarium material already at

Kew. It seems desirable to place the results on record for the benefit of future workers.

The first set of specimens, comprising 121 sheets, has been presented on behalf of the Scientific Expeditionary Research Association to Kew; the second set, comprising 95 sheets, has been presented to the British Museum.

Polygalaceae.

Securidaca erecta *Jacq.* Enum. Pl. Carib. 27 (1760); Griseb. Fl. B.W.I. 29; Fawcett and Rendle, Fl. Jam. iv. 246.—*S. volubilis* L. Syst. ed. 10, 1155 (1759), non Sp. Pl. 707.

Arima Reserve, 90 m., no. 203.

The involved synonymy of this species has been elucidated by Fawcett and Rendle, l.c. *Securidaca volubilis* L. Sp. Pl. ed. 1, is *Nissolia fruticosa* Jacq. (*Leguminosae*).

Hypericaceae.

Vismia cayennensis (*Jacq.*) *Pers.*; Griseb. l.c. 111; Mart. Fl. Bras. xii. pars 1, 199, t. 36.—*Hypericum cayennense* Jacq.

Arima Reserve, 90 m., no. 204.

A large-leaved form.

V. falcata *Rusby*, Descr. N. Sp. S. Am. Pl. 59 (1920).— *V. ferruginea* Griseb. l.c. 111, partim, quoad stirp. trinit., non H.B.K.

Cumuto Road, 30 m., no. 92.

Previously recorded only from Santa Catalina in the Orinoco Delta. The following specimens from Trinidad in the Kew Herbarium are referable to *V. falcata*: in the forests of Arima, *Eggers* 1420; St. Anne, *Crueger*; without locality, *Sieber* 100 and *Fendler* 217.

V. ferruginea H.B.K. (Nov. Gen. et Sp. v. 183) is described as having elliptic-oblong leaves 3–4½ inches long, and is a native of the upper Orinoco. Grisebach erroneously united several distinct species under this name.

V. guianensis (*Aubl.*) *Choisy*; Mart. Fl. Bras. xii. pars 1, 202.—*Hypericum guianense* Aubl. Pl. Guiane, ii. 784, t. 311.

Arima watershed, 600 m., nos. 76, 83.

The genus *Vismia* is in urgent need of revision, many of the old species being imperfectly known or misunderstood.

Guttiferae.

Tovomita Eggersii *Vesque*, Epharm. iii. 19, t. 94 (1892); DC. Monogr. viii. 203 (1893).—*T. amazonica* Griseb. l.c. 106, non Walp.

Arima–Blanchisseuse Road, 600 m., no. 77.

Tovomita amazonica was recorded from Trinidad by Grisebach, but Crueger's specimen from Fort George which he cites is *T. Eggersii*. Both *T. amazonica* and *T. Eggersii* are recorded from Trinidad in Hart's Herbarium List. According to Engler (Mart. Fl. Bras. xii. pars 1, 445) and Vesque (DC. Monogr. viii. 195),

T. amazonica is known only from the Amazons basin. The Trinidad material named *T. amazonica* in the Herbarium List should be re-examined. *T. amazonica* has only two sepals whereas *T. Eggersii* has four.

QUIINACEAE.

Quiina Cruegeriana *Griseb.* l.c. 106.
Mora Forest, St. Andrew, no. 206.

MALPIGHIACEAE.

Byrsonima crassifolia (*L.*) *H.B.K.*; Griseb. l.c. 114; N. Am. Fl. xxv. 168; Riley in Kew Bull. 1923, 163.
Aripo Savannah, 30m., no. 88.

Diplopterys Marshalliana *Riley*, sp. nov.; affinis *D. Paralias* A. Juss. a qua foliis ovatis haud ovato-lanceolatis, bracteolis minoribus triangulato-ovatis haud lineari-obovatis, floribus majoribus differt.

Caulis scandens, 3·5 mm. diametro infra apicem, glaber. *Folia* ovata, 13·5–15 cm. longa, 5·5–6·5 cm. lata, acuminata, basi cuneata vel obtusa, integra, margine basi inconspicue glandulosoincrassato, coriacea, utrinque glabra, supra opaca, costa et nervis lateralibus et rete venularum manifestis, nervis lateralibus anastomosantibus areolis medio laminae circiter 2·5 cm. longis et 2 cm. latis, subtus pallidiora, conspicue reticulata, rete utrinque elevata; petioli 0·7–1 cm. longi; stipulae delapsae. *Pedunculi* 3–4-fasciculati, circiter 4-flori, 7–8 mm. longi, appresse fuscopubescentes, basi bractea 0·5 mm. longa muniti, infra medio 2 bracteolas triangulato-ovatas 1 mm. longas gerentes. *Pedicelli* umbellati, e fasciculo bracteolarum orientes, 1·5–1·7 cm. longi. *Calyx* 2 mm. altus, 8-glandulosus, lobis 1·25 mm. altis apice rotundatis. *Petala majora* lamina orbiculata, 1·2 cm. longa, 9 mm. lata, fimbriata, lutea, extra dense villosa, intus glabra, ungue 2·5 mm. longo; *minora* lamina 6 mm. longa, 3 mm. lata, ungue 3·5 mm. longo. *Stamina* 10, omnia fertilia; filamenta inaequalia, 1·5–2·5 mm. longa, basi applanata, glabra, in tubum circiter 0·5 mm. longum connata; antherae 1·5 mm. longae, minute et sparse setosae. *Ovarium* in toro breviter producto insidens, 2 mm. altum, 3-angulosum, fere ad basin tripartitum, dense villosum; styli 3, inaequales, major 5 mm. minores 3 mm. longi, subulati, incurvi, truncati, glabri, stigmatibus minute lamelliformibus. *Fructus* ignotus.

TRINIDAD: Arena Reserve, 60 m., fl. May, *Riley* 94 (type in Herb. Kew.). A duplicate of the type-number is in Herb. Mus. Brit.

LEGUMINOSAE.

Brownea latifolia *Jacq.* sensu Griseb. l.c. 212.
Hills behind Port-of-Spain, 240 m., fl. and fr., no. 60.

The genus *Brownea* affords an excellent example of the confusion which may be caused by describing new species from imperfect material. In 1788 Bredemayer and Schücht discovered

five species of *Brownea* in the neighbourhood of Caracas and brought thirty-two young trees to the Imperial Conservatories at Schoenbrunn. These survived for some time but did not thrive, and showed no signs of producing flowers. Several plants of individual species died, and the attempt to propagate them by means of cuttings failed except in the case of *B. leucantha*. Lest knowledge of such singular plants should be lost, Jacquin described the five new species as far as possible, adding figures and descriptions of the flowers from dried specimens. These figures and descriptions have unfortunately proved inadequate for purposes of identification. Pittier, who has recently revised the species of *Brownea* represented in the United States National Herbarium, was unable to identify *B. racemosa*, *B. capitella* and *B. leucantha* (Contrib. U.S. Nat. Herb. xviii, 145).

Satisfactory determination of the species occurring in Trinidad can only be effected by study of the living trees combined with preparation of an adequate series of herbarium specimens illustrating all parts of the plant.

Calliandra Guildingii *Benth.;* Griseb. l.c. 225.

Arena Reserve, 60 m., no. 95.

MYRTACEAE.

Calycolpus sp.

Cumuto Road, 30 m., no. 97.

This is very nearly related to *C. glaber* (Benth.) Berg, but differs in the considerably larger and broader leaves more generally rounded at the base, and in the narrower subacute calyx lobes. The genus needs revision; until then I prefer to keep this Trinidad plant separate.

Eugenia Baileyi *Britton* in Bull. Torr. Bot. Club xlviii. 334 (1921).

Arima-Blanchisseuse Road, 540 m., no. 71.

Collected in the Morne Bleu Forest in fruit by Britton, Freeman and Bailey in March, 1921. My specimens are in the flowering stage, which is not described by Dr. Britton, and supplement the only sheet of the species at Kew.

MELASTOMACEAE.

Conostegia subhirsuta *DC.;* Cogn. in DC. Monogr. vii. 706; Griseb. l.c. 253.

Arima-Blanchisseuse Road, 600 m., no. 73.

Miconia albicans (*Sw.*) *Triana;* Cogn. l.c. 785.—*M. holosericea* DC.; Griseb. l.c. 256.

Hills behind Port-of-Spain, 90 m., no. 63.

M. calophylla *Crueger* in Linnaea, xx. 109 (1847).—*M. Cruegeri* Triana in Trans. Linn. Soc. xxviii. 131 (1871). *M. ciliata* Cogn. l.c. 867, partim, non DC. *M. racemosa* var. *ciliata* Griseb. l.c. 258, pro parte minore.

Arima-Blanchisseuse Road, 450 m., no. 69.

Crueger, who had a special knowledge of the *Melastomaceae* of Trinidad, considered *M. calophylla* distinct from any species previously described. Triana retained the species but altered the name to *M. Cruegeri* on account of the existence of the previously published *Cremanium calophyllum* D. Don. Cogniaux, who, unlike Crueger and Triana, had no experience of *Melastomaceae* in the field, regarded *M. calophylla* Crueger as a synonym of *M. ciliata* Cogn. I found *M. calophylla* in rain-forest and *M. ciliata* in savannah. Unless, or until, intermediate forms are found, it seems desirable to treat *M. calophylla* and M. *ciliata* as distinct species.

M. ciliata (*Rich.*) *DC.*; Cogn. l.c. 867.—*M. racemosa* var. *ciliata* Griseb. l.c. 258, pro parte majore.

Aripo Savannah, 30 m., no. 89.

M. lacera (*Bonpl.*) *Naud.*; Griseb. l.c. 258; Cogn. l.c. 866.

Arima Reserve, 90 m., no. 201.

M. nervosa (*Smith*) *Triana* in Trans. Linn. Soc. xxviii. 111; Cogn. l.c. 818.—*Tschudya spondylantha* Griseb. l.c. 251.

Arima-Blanchisseuse Road, 600 m., no. 74. Cumuto Road, 30 m., no. 98. Mora Forest, St. Andrew, no. 209.

M. prasina var. **collina** *Triana* l.c. 109; Cogn. l.c. 806.—*M. prasina* Griseb. l.c. 257, partim. *Miconia collina*, DC.

Arima-Blanchisseuse Road, 330 m., no. 67. Cumuto Road, 30 m., no. 93. Arima Reserve, 90 m., no. 202.

M. racemosa (*Aubl.*) *DC.*; Griseb. l.c. 258, excl. syn.; Cogn. l.c. 869.

Arima watershed, 600 m., no. 81.

Samydaceae.

Ryania speciosa *Vahl*, Ecl. i. 51, t. 9 (1796); Griseb. l.c. 296; Mart. Fl. Bras. xiii. pars 1, 492.

Arena Reserve, 60 m., no. 96.

R. speciosa appears to be confined to Trinidad and northern Venezuela, though Grisebach, almost certainly in error, adds Guiana to the area of distribution.

Cucurbitaceae.

Anguria umbrosa *Kunth*; Griseb. l.c. 289; Cogn. in DC. Monogr. iii. 677, and in Engl. Pflanzenr. Cucurb.-Fevill. & Melothr. 190.

Blue Basin, 90 m., no. 220.

Begoniaceae.

Begonia glandulifera *Griseb.* l.c. 304; O. E. Schulz in Urb. Symb. Antill. vii. 6.

Blue Basin, 90 m., no. 218.

B. humilis *Ait.*; Dryander in Trans. Linn. Soc. i. 166, t. 15; Griseb. l.c. 304; O. E. Schulz l.c. 26.

Near Four Roads, 30 m., no. 215.

Not included in Hart's List of the Trinidad Herbarium, though recorded for the island by Grisebach.

RUBIACEAE.

Cephaëlis tomentosa *Willd.*; Griseb. l.c. 346.—*Psychotria tomentosa* Muell. Arg. in Mart. Fl. Bras. vi. pars 5, 370.

Mora Forest, St. Andrew, no. 208.

Duggena spicata (*Lam.*) *Standley* in Contrib. U.S. Nat. Herb. xviii. 126 (1916).—*Lygistum spicatum* Lam. *Gonzalea spicata* DC.; Griseb. l.c. 321.

Arima-Blanchisseuse Road, 540 m., no. 72. Near Four Roads, 30 m., no. 213.

Under the International Rules of Nomenclature (Art. 15) the generic name *Duggena* Vahl (1793) has precedence over *Gonzalagunia* Ruiz et Pav. (1794) and *Gonzalea* Pers. (1805).

Isertia parviflora *Vahl*, Ecl. ii. 28, t. 15; Griseb. l.c. 320; Mart. Fl. Bras. vi. pars 6, 288.

Cumuto Road, 30 m., no. 91.

The genus *Isertia* is exceptional among the *Mussaendeae* in the aestivation of the corolla-lobes being contorted in this and other species instead of valvate.

Palicourea crocea (*Sw.*) *Roem. et Schult.*; Griseb. l.c. 345; Urb. Symb. Antill. viii. 683.

Arima watershed, 600 m., no. 75.

Warscewiczia coccinea *Klotzsch*; Griseb. l.c. 325; Mart. Fl. Bras. vi. pars 6, 216, t. 114.

Arima-Blanchisseuse Road, 330 m., no. 66.

COMPOSITAE.

Clibadium surinamense *L.*; O. E. Schulz in Urb. Symb. Antill. vii. 78.—*C. surinamense* var. *asperum* Baker in Mart. Fl. Bras. vi. pars 3, 152. *C. asperum* DC.; Griseb. l.c. 367.

Arima watershed, 600 m., no. 82.

Full synonymy of *C. surinamense* is given by O. E. Schulz l.c.

CAMPANULACEAE.

Centropogon surinamensis (*L.*) Presl.; Bot. Mag. t. 225; DC. Prodr. vii. 345; Griseb. l.c. 385; Mart. Fl. Bras. vi. pars 4, 134 t. 39.

Arima watershed, 600 m., no. 78.

APOCYNACEAE.

Angadenia nitida (*Vahl*) *Miers.*—*Echites nitida* Vahl, Ecl. ii. 19, t. 13. *Odontadenia nitida* Muell. Arg. in Mart. Fl. Bras. vi. pars 1, 118; Griseb. l.c. 416.

Near Four Roads, 30 m., no. 214.

Tabernaemontana undulata *Vahl*, Ecl. ii. 20, t. 6 ; Griseb. l.c. 409.

Arima Reserve, 90 m., no. 205.

BORRAGINACEAE.

Cordia cylindristachya (*Ruiz et Pav.*) *Roem. et Schult. ;* Griseb. l.c. 480.— *Varronia cylindristachya* Ruiz et Pav. Fl. Peruv. ii. 23. *V. macrostachya* Ruiz et Pav. l.c. t. 147, f. a.

Arima-Blanchisseuse Road, 330 m., no. 68.

Tournefortia trinitatis *Riley*, sp. nov. ; affinis *T. tomentosae* Mill. a qua foliis haud cordatis pro rata longioribus conspicue discoloribus acumine longiori, floribus confertioribus differt.

Fruticulus volubilis. *Ramuli* teretes, satis robusti, 2 mm. diametro 20 cm. infra apicem, tomentosi, demum pubescentes. *Folia* ovato-lanceolata vel lanceolata, 3–7 cm. longa, 1·4–3·5 cm. lata, acute acuminata, basi obtusa vel rotundata, integra, supra scabrido-puberula, in sicco obscura, subtus dense stellato-tomentosa, in sicco grisea, nervis lateralibus utrinque circiter 7 ; petioli 2–5 mm. longi, tomentosi. *Inflorescentia* patule ramosa, ramis 4–10 iterum ramosis vel simplicibus ; spicae 12–20–florae, floribus 0·5–1 mm. remotis sessilibus viridibus. *Calyx* cupularis, villosus, limbo vix 0·5 mm. longo, dentibus subulatis 1·5 mm. longis. *Corolla* 3 mm. longa, extra villosa, tubo 2 mm. lobis subulatis 1 mm. longis. *Antherae* 0·75 mm. longae, minute et sparse pubescentes ; filamenta vix 0·25 mm. longa, 0·5 mm. infra lacinias corollae inserta. *Ovarium* ovoideum, 0·75 mm. diametro, glabrum ; stylus clavatus, 0·75 mm. altus. *Nuculae* globosae, 1·5 mm. diametro, rugulosae, glabrae.

TRINIDAD : near Four Roads, 30 m., fl. and fr. May, *Riley* 210 (type in Herb. Kew.) ; *von Rohr* 21 (Herb. Mus. Brit.) ; *Fendler* 574 (Herb. Kew.). A duplicate of the type-number is in Herb. Mus. Brit.

Von Rohr's specimen is labelled *Tournefortia trinitatis* but, so far as I can ascertain, this name has never been published. Fendler's specimen is named *T. tomentosa* Mill. I have seen Miller's type specimen at the British Museum ; the distinctly cordate somewhat roundish leaves readily distinguish it from *T. trinitatis*.

SOLANACEAE.

Acnistus arborescens (*L.*) *Schlecht. ;* Griseb. l.c. 435.— *Atropa arborescens* L. *Cestrum cauliflorum* Jacq. Hort. Schoenbr. iii. 41, t. 325.

Arima watershed, 600 m., no. 80. Rocks by Blue Basin, 90 m., no. 217.

Acnistus punctatus *Riley*, sp. nov. ; ab *A. arborescenti* Schlecht. foliis pellucido-punctatis multo minoribus, floribus minoribus tubo corollae lobis vix longiori recedit.

Frutex. *Ramuli* robusti, 0·7 cm. diametro 20 cm. infra apicem, flexuosi, rugosi, albido-cinerei, minute et sparse nigro-punctati,

medulla modo scalariformi interrupta. *Folia* obovato-elliptica in petiolum gradatim angustata, 4·5–5 cm. longa, 2–2·5 cm. lata, apice obtusa vel subacuta, integra vel inconspicue et minute crenulata, concoloria, irregulariter pellucido-punctata, juniora utrinque farinacea, mox supra sparse pilosa subtus glabra ; petioli circiter 5 mm. longi. *Flores* circiter 20–fasciculati, albidi ; pedicelli 7 mm. longi, glabri, apice incrassati. *Calyx* campanulatus, 2·5 mm. altus, lobis 0·75 mm. altis truncatis minute mucronatis inclusis, minutissime pilosus. *Corollae tubus* 4 mm. altus, extra minute puberulus, intus glaber ; lobi ovato-lanceolati 3·5 mm. alti, acuti. *Filamentorum pars libera* 5 mm. longa, glabra, parte corollam adnata 2 mm. longa ; antherae fere 2 mm. longae. *Ovarium* late ovoideum circiter 1 mm. diametro, glabrum ; stylus glaber, fere 7 mm. longus stigmate capitato. *Fructus* ignotus.

Trinidad : Arima Reserve, 90 m., fl. May, *Riley* 99 (type in Herb. Kew.). A duplicate of the type-number is in Herb. Mus. Brit.

Solanum callicarpifolium *Kunth ;* Griseb. l.c. 438.

Cumuto Road, 30 m., no. 90.

Bignoniaceae.

Phryganocydia corymbosa (*Vent.*) *Bur. ;* Mart. Fl. Bras. viii. pars 2, 249, t. 100.—*Spathodea corymbosa* Vent. Choix, t. 40. *Macfadyena corymbosa* Griseb. l.c. 449 ; Seem. in Journ. Bot. 1863, 227.

Near Four Roads, 30 m., no. 212.

Verbenaceae.

Aegiphila trinitensis *Britton* in Bull. Torr. Bot. Club l. 54 (1923).— *A. laevis* Griseb. l.c. 499, non Willd.

Hills behind Port-of-Spain, 90 m., no. 64.

As Britton points out, the Trinidad shrub referred by Grisebach to *A. laevis* (*Manabea laevis* Aubl. Pl. Guiane, i. 66, t. 25) is a distinct species, as is evident on comparison with Aublet's figure.

Piperaceae.

Peperomia serpens (*Sw.*) *Loud. ;* Fawcett and Rendle, Fl. Jam. iii. 11.—*P. scandens* Ruiz et Pav. ; C. DC. in Urb. Symb. Antill. iii. 248. *P. repens* Kunth ; Griseb. l.c. 165.

El Tucuche, no. 65.

Piper aripoense *Trelease* in Bull. Torr. Bot. Club li. 5 (1924).

Arima watershed, 600 m., no. 87 bis.

P. dilatatum *L. C. Rich. ;* C. DC. l.c. 197 ; Fawcett and Rendle l.c. 26, f. 2.— *Artanthe Bredemeyeri* Griseb. l.c. 170, partim, non Miq.

Arima Reserve, 90 m., no. 100.

P. arboreum *Aubl.* Pl. Guiane, i. 23 (1775); Fawcett and Rendle l.c. 23.—*P. geniculatum* Sw. Prodr. 15 (1788); C. DC. l.c. 178. *Artanthe geniculata* Miq.; Griseb. l.c. 172.

Arima watershed, 600 m., no. 87.

P. hispidum *Sw.* (1788); C. DC. l.c. 187; Fawcett and Rendle, l.c. 25.—*P. scabrum* Sw. (1797); Fawcett and Rendle, l.c. 25. *Artanthe scabra* Miq.; Griseb. l.c. 171.

Arima watershed, 600 m., no. 86.

I have followed C. De Candolle in treating *Piper scabrum* as conspecific with *P. hispidum* Sw.

P. Schachii *C. DC.*; C. DC. l.c. 183. — *Artanthe coruscans* Griseb. l.c. 171, partim, non Miq.

Blue Basin, 90 m., no. 219.

The specimen in the Kew Herbarium collected by Crueger at Maraval, and labelled *Artanthe coruscans* in Grisebach's writing, is *P. macrophyllum* " H.B.K. " sensu C. DC. l.c. 194. Judging from the measurements given, the Venezuelan plant described by Kunth as *P. macrophyllum* Sw. may be a distinct species.

P. tuberculatum *Jacq.*; C. DC. l.c. 177; Fawcett and Rendle l.c. 22.— *Artanthe tuberculata* Miq.; Griseb. l.c. 171.

Hills behind Port-of-Spain, no. 61. Near Four Roads, 30 m., no. 211.

Monimiaceae.

Siparuna guianensis *Aubl.* Pl. Guiane, ii. 865, t. 333; Perkins and Gilg in Engl. Pflanzenr. Monimiac. 113.—*Citriosma guianensis* Tul.; Griseb. l.c. 9; Mart. Fl. Bras. iv. pars 1, 306.

Mora Forest, St. Andrew, no. 207.

Euphorbiaceae.

Alchornea triplinervia (*Spreng.*) *Muell. Arg.* var. **trinitatis** *Riley*, var. nov.

Folia elliptico-lanceolata, 8–13 cm. longa, 3·5–5 cm. lata obtuse acuminata, basi obtusa vel subtruncata, subcoriacea; petioli 2–4 cm. longi. *Rhaches inflorescentiae feminae* satis dense pilosae.—*A. glandulosa* Hart Trinidad Herb. List, 52 (1908), non Poepp. et Endl.

Arima watershed, 600 m., fl. and fr. May, *Riley* 84. Arima, *Crueger* 283. Morne Bleu, *Britton, Freeman and Bailey* 2280.

This differs from var. *crassifolia* Muell. Arg. in the larger and relatively longer leaves, and the rather densely pilose rhachis of the inflorescence. It agrees well with *Britton, Freeman and Bailey* 2280 and is probably convarietal also with *Crueger* 283; the material of the latter number is very poor. Both numbers have been named *A. glandulosa* Poepp. et Endlich., the former at the New York Botanical Garden, the latter by Grisebach, who, however, cited no specimen of *Alchornea* from Trinidad in his flora. It undoubtedly comes within *A. triplinervia* Muell. Arg. as circumscribed by Pax and K. Hoffmann in Engl. Pflanzenr.

Euphorb.–Mercurialin. 227. Pax and Hoffmann referred Crueger's specimen doubtfully to var. *crassifolia* Muell. Arg. in which they included var. *meridensis* Muell. Arg. The former of these varieties is a native of Peru, the latter of the alpine region of Merida, Venezuela. I have not seen specimens of either variety.

LACISTEMACEAE.

Lacistema aggregatum (*Berg.*) *Rusby ;* Fawcett and Rendle, Fl. Jam. iii. 30.—*L. myricoides* Sw. ; Mart. Fl. Bras. iv. pars 1, 282, t. 81, f. 3 ; Griseb. l.c. 25. *Piper aggregatum* Berg.
Arima watershed, 600 m., no. 85.

ORCHIDACEAE.

Rodriguezia secunda *Kunth ;* Griseb. l.c. 634 ; Mart. Fl. Bras. iii. pars 6, 150, t. xl. f. 2.
Bamboo plantation near San Juan, no. 221.

MUSACEAE.

Heliconia hirsuta *L. f. ;* K. Schum. in Engl. Pflanzenr. Musac. 39 ; Griseb. l.c. 600.
Hills behind Port-of-Spain, 150 m., no. 62.

MARANTACEAE.

Stromanthe Tonckat (*Aubl.*) *Eichl. ;* K. Schum. in Engl. Pflanzenr. Marantac. 149.—*Maranta Tonckat* Aubl. ; Griseb. l.c. 605 ; Roscoe, Monandr. t. 30.
Arima watershed, 600 m., no. 79.

BROMELIACEAE.

Catopsis nutans *Griseb.* l.c. 599 ; Mez in DC. Monogr. ix. 623.
Arima-Blanchisseuse Road, 600 m., no. 223.

COMMELINACEAE.

Rhoeo discolor (*L' Hérit.*) *Hance ;* C. B. Clarke in DC. Mongr. iii. 316.—*Tradescantia discolor* L'Hérit. ; Griseb. l.c. 524.
Five Islands, no. 222.

ARACEAE.

Spathiphyllum cannifolium (*Dryander*) *Schott ;* Griseb. l.c. 509 ; Engl. Pflanzenr. Arac.-Monsteroid. 132.
Near Four Roads, 30 m., no. 216.

XVIII.—NEW SPECIES OF INDIGOFERA FROM THE TRANSVAAL AND SWAZILAND.

N. E. BROWN.

In elaborating the species of this genus for Dr. Burtt Davy's Flora of the Transvaal and Swaziland I find that 32 out of a total of 70 species are undescribed, a very large percentage, and as the work in question is not quite ready for publication,

it has been deemed advisable to issue the following descriptions in advance. The types, which are in the Kew Herbarium, are alone quoted in this paper; the remainder of the specimens referred to these species will be cited in the Flora.

As the stipules are small and subulate in all the species described, and the corolla varies very little except in size, colour and pubescence, the structural details of these organs afford no distinctive characters and are not mentioned in the descriptions. The general inutility of these organs for distinctive purposes, combined with the great similarity in general features which many species bear to one another, render the discrimination of the species of this genus one of great difficulty. Therefore in place of the usual diagnostic contrasts of the affinity of the species, which are practically useless without a complete revision of this large and intricate genus, a working key to the species here described is substituted.

Clavis Specierum.

*Caules vel folia, racemi vel calyx glandibus stipitatis conspicuis vel setis eglandulosis vel punctis rigidis instructi, interdum ramis glandibus sessilibus; folia 1–3 cm. longa; foliola utrinque pubescentia, lateralia opposita:

Foliola margine et costa setulis minutis rigidis eglandulosis scabrida, caule inferne plerumque setis eglandulosis instructo ..... 10. **crebra.**

Foliola haud scabrida sed interdum marginibus glandulis stipitatis ciliata:

Annuae, 5–20 cm. altae; foliola 7–9, plerumque minute glandulosa et etiam pubescentia; racemi 15-22 mm. longi, folia excedentes ..... 1. **Junodii.**

Perennes, 15–40 cm. alti vel ultra:

Frutex lignosus, 40 cm. altus vel ultra; ramuli annotini albocinerei et setis rigidis scabridi; foliola 5–13; racemi 2–9 cm. longi; corolla 1 cm. longa ..... 6. **rudis.**

Plantae infra 40 cm. altae, ramulis junioribus petiolis foliorum marginibus vel racemis glandibus minutis stipitatis instructis sed haud conspicue setosis:

Caules juniores brunnei et glandibus minutis stipitatis scabridi; foliola 3–11 (plerumque 7–9), angusta; racemi 2–8 cm. longi, foliis aequilongi vel longiores; corolla 6 mm. longa..... 14. **hybrida.**

Caules juniores et ramuli canescentes vel viridescentes; corolla 5–6 mm. longa:

Ramuli juniores in sicco angulares vel canaliculati; foliola glandibus minutis stipitatis apicem versus marginata; calyx 3·5–4 cm. longus .. 5. **enormis.**

Ramuli juniores teretes; foliola marginibus eglandulosis; calyx 2–2·5 mm. longus ..... 7. **lydenburgensis.**

*Caules, folia et cetera glandibus stipitatis haud instructa et setosa ; folia foliolis oppositis :

†Planta aut caulibus junioribus, foliis vel racemis pilis plus minusve patulis vel pilorum apicibus supra paginam elevatis et plerumque basifixis, aut in axillis petiolorum vel foliolorum glandibus fasciculatis minutis nigris brunneis vel rubescentibus et etiam pilis vel appressis vel patulis instructis:

Corolla 7–10 mm. longa ; foliorum foliola 3–9, in axillis glandulorum fasciculis instructa vel exempta ; racemi ascendentes et superne plus minusve spicatim conferti ; calycis lobi corolla dimidio longiores vel fere aequilongi ..... 13. **compacta.**

Corolla 12–14 mm. longa ; foliola utrinque indumento subtomentoso vel appresse sericeo et plerumque glandibus fasciculatis axillaribus ; flores purpurei :

Foliola 7–21 ; carinae petalum 3·5–4 mm. altum ..... 19. **Nelsonii.**

Foliola 5–11 ; carinae petalum 2–2·5 mm. altum ..... 20. **pongolana.**

Corolla 3–6 mm. longa :

Foliola 13–25 mm. longa, 6–12 mm. lata ; caules primarii 2–4 mm. crassi, pilis brevibus patulis ferrugineis induti ; racemi florum 2–3 fasciculis distantibus .. 21. **perplexa.**

Foliola 4–20 cm. longa, 1·5–6 mm. lata ; caules primarii 0·75–2·5 mm. crassi, pilis ferrugineis haud induti :

Foliola vel petioli glandibus axillaribus fasciculatis minutis nigris brunneis vel rubescentibus instructi :

Folia 8–15 mm. longa, foliolis 5–7 circiter 4–8 mm. longis supra glabris ; racemi 5–10 mm. longi, foliis haud vel vix longiores ; fructus 10–18 mm. longus, 2·5–3 mm. crassus .....25. **obscura.**

Folia 15–50 mm. longa, foliolis 9–21 circiter 3–10 mm. longis plerumque longitudinaliter volutis :

Foliola utrinque pubescentia ; caules primarii 0·75–1·75 mm. crassi, basi tantum lignosi ; racemi foliis plerumque breviores.....16. **commixta.**

Foliola supra glabra ; caules primarii 2–5 mm. crassi, lignosi ; racemi foliis longiores .....17. **comosa.**

Foliola et petioli glandibus axillaribus haud instructa :

Annua ; racemi laxissimi, floribus 4–10 mm. distantibus ; corolla circiter 3 mm. longa, alba ..... 2. **cognata.**

Perennis (semper ?) ; racemi alabastro floribus dense confertis demum 1·4 mm. distantibus ; corolla supra 3 mm. longa, purpurea :

Caulis, petioli et pedunculi pilis pallidis induti ; pedunculus infra cicatricem florum ultimorum delapsorum 5–15 mm. longus et foliis multo

brevior ; corolla circiter 6–7 mm. longa, calycis lobis longior .....9. **ingrata.**

Caulis, petioli et pedunculi pilis nigris et albis induti ; pedunculus infra cicatricem florum ultimorum delapsorum 25–45 mm. longus et foliis aequilongus vel longior ; corolla 4–5 mm. longa calycis lobis aequilonga .....18. **accepta.**

†Plantae caulibus novellis pedunculis et foliis (foliolis *I. cognatae* exceptis) pilis appressis et plerumque medifixis instructae apicibus liberis supra epidermidem haud elevatis, vel caulibus et pedunculis fere glabris, fasciculis glandulosis exemptae :

Ramuli novelli indumento appresso albescentes ; caules maturi lignosi :

Folia foliolis 3 ; corolla 3–4 mm. longa .... 22. **subincana.**

Folia foliolis 5–9 ; corolla 6–7 mm. longa ..... 5. **enormis.**

Ramuli vel caules novelli brunnei, cinereo-brunnei, purpurei, virides vel leviter canescentes vel sicco nigrescentes :

Axis racemorum maturorum vel fructiferorum 0·5–6 cm. longus, foliis aequalis vel brevior :

Corolla 12–15 mm. longa :

Folia 2–4 cm. longa, foliolis 5–15 utrinque appresse pubescentibus..... 11. **tristoides.**

Folia 1–2 cm. longa, foliolis 5–9 supra glabris ..... 15. **densa.**

Corolla 3·5–6 mm. longa :

Folia 5–6 mm. distantia, minima, 10–15 mm. longa, foliolis 5–7 supra glabris ; racemi 5–10 mm. longi ; corolla circiter 5–6 mm. longa ; fructus teretes, atro-brunnei ..... 25. **obscura.**

Folia 20–30 mm. distantia, 15–50 mm. longa, foliolis 3–7 :

Fructus subtetragoni, curvati ; foliola 3, oblonga vel lanceolata ; caules canescentes ..... 22. **subincana.**

Fructus complanati, pallidi :

Foliola 3–7, linearia ; corolla circiter 3·5–4 mm. longa ; fructus 17-25 mm. longi ....3. **relaxata.**

Foliola 5, oblonga, elliptica vel elliptico-oblonga, corolla 5–6 mm. longa ; fructus 8–13 mm. longi ..... 4. **Holubii.**

Axis racemorum maturorum vel fructiferorum foliis longior (saepe duplo vel ultra) :

‡Corolla 8–16 mm. longa ; pedicelli 2–4 mm. longi ; calyx 2 mm. longus, lobis tubo aequilongis deltoideis acutis :

Caulis sulcatus, costis quam sulcis aequilatis vel latioribus ; folia sicco nigrescentia ; corolla 8–10 mm. longa .....26. **frondosa.**

Caulis angularis, costis vel angulis quam sulcis multo angustioribus ; folia sicco viridescentia vel pallida :
Racemi foliis aequilongi vel usque ad duplo longiores ; foliola plana, costa infra valde prominenti ; corolla 10–16 mm. longa .....11. **tristoides.**
Racemi foliis subtendentibus 4–6-longiores ; foliola voluta, costa infra vix prominenti ; corolla circiter 10 mm. longa ..... 29. **ripae.**

‡Corolla 6–8 mm. longa ; caulis, folia et pedunculus subglaber, pilis minutis et sparsis ; foliola 3–7 :
Foliolum terminale 15–30 mm. longum, foliolis lateralibus duplo vel ultra longius.... .....27. **Masonae.**
Foliolum terminale foliolis lateralibus plerumque subaequale ; foliola supra glabra ; corolla 6–7 mm. longa :
Folia 15–30 mm. longa ; foliolum terminale 10–18 mm. longum .....28. **lepida.**
Folia 8–10 mm. longa ; foliola 3–5 mm. longa ..... 23. **brevifolia.**

‡Corolla 3–6 mm. longa :
Folia minima, 8–15 mm. longa, foliolis 2–6 mm. longis :
Foliola utrinque appresse pubescentia ; racemi 4–9 cm. longi, pedunculo infra florum ultimorum delapsorum cicatricem foliis breviore..7. **lydenburgensis.**
Foliola supra glabra ; racemi 10–17 mm. longi, foliis usque ad duplo longiores, pedunculo infra florum ultimorum delapsorum cicatricem foliis aequilongo vel paulo longiore .....24. **pauxilla.**

Folia supra 15 mm. et plerumque 20–50 mm. longa, foliolis planis 5–30 mm. longis :
Foliola 12–30 mm. longa ; racemi foliis aequales vel paulo longiores, pedunculo infra florum ultimorum delapsorum cicatricem tantum 3–8 mm. longo .....22. **subincana.**

Foliola 5–16 mm. longa ; racemi foliis multo longiores, pedunculo infra florum ultimorum delapsorum cicatricem 15–40 mm. longo :
Foliola supra glabra :
Foliola 2·5–4 mm. lata ; racemi maturi vix ultra 5–6 cm. longi .....8. **placida.**
Foliola 3·5–9 mm. (plerumque 5 mm.) lata ; racemi maturi 5–11 cm. longi ..32. **floribunda.**

Foliola utrinque pubescentia sed supra pilis interdum inconspicuis :
§Foliola supra pilis tenuissimis basifixis apicibus liberis induta ; calyx circiter 1·5 mm. longus, lobis tubo duplo longioribus :
Annua ; corolla 3 mm. longa, alba ; fructus 10–14 mm. longus .....2. **cognata.**

Perennis ; corolla 4 mm. longa, rubra vel purpurea ; fructus 17–25 mm. longus ..... 12. **dissimilis.**

§Foliola supra pilis arcte appressis medifixis induta :

Calycis lobi subulati, tubo ultra duplo longiores et corolla circiter dimidio breviores :

Pedunculus infra florum ultimorum delapsorum cicatricem 30–40 mm. longus, folio circiter dimidio brevior ; caulis pilis nigris et albis indutus ..... 18. **accepta.**

Pedunculus infra florum ultimorum delapsorum cicatricem 5–18 mm. longus, folio multo brevior ; caules virides, pilis pallidis ; fructus deflexi :

Folia foliolis plerumque 5 (interdum 3) ; fructus plani ..... 4. **Holubii.**

Folia foliolis 7–11 ; fructus cylindrici ..... 9. **ingrata.**

Calycis lobi deltoidei tubo vix duplo longiores saepe eo aequilongi et corolla quam dimidio multo breviores ; pedicelli 2–4 mm. longi ; fructus cylindrici :

Foliola 5–9 ; corolla alabastro obtusa ..... 31. **Galpinii.**

Foliola 9–13 ; corolla alabastro apiculo minuto et saepe leviter recurvato ..... 30. **amitina.**

1. **I. Junodii** *N.E.Br.* sp. nov.—Annual, 5–20 cm. high, with the branches petioles and racemes covered with spreading gland-tipped hairs. Leaves 1–2·5 cm. long ; leaflets 7–9, the lateral opposite in 3–4 pairs, 2–5 mm. long, 1–2·5 mm. broad, oblong or obovate oblong, rounded at the apex, scarcely apiculate, thinly adpressed-pubescent and usually with some minute stalked glands on both sides. Racemes 15–22 mm. long, exceeding the leaves, slender 6–10-flowered. Calyx-lobes 1 mm. long. No perfect corolla seen, but it appears to be about 3·5 mm. long, reddish-pink, according to Junod. Pods 15–19 mm. long, terete, straight.

Transvaal. Pietersburg Distr. : Shilouvane, *Junod* 645 ! Type.

2. **I. cognata** *N.E.Br.* sp. nov.—Apparently annual, branching from the base, 30–35 cm. high ; stems 1–1·5 mm. thick below, somewhat 3-angled at the upper part, becoming terete at the base, thinly adpressed-pubescent with centrally fixed minute hairs, green. Leaves 2–3·5 cm. long ; leaflets 7–11, the lateral opposite in 3–5 pairs, the basal pair not close to the stem, 5–16 mm. long, 1·5–5 mm. broad, oblong, rounded at the apex, obtuse at the base, loosely and somewhat thinly pubescent on both sides with fine outstanding or spreading hairs. Racemes 3–9 cm. long, 2–2·5 times as long as the leaves,

very slender, laxly several-flowered, with the peduncle below the lowest scar of fallen flowers as long as or longer than the petiolar axis. Pedicels 1–1·5 mm. long. Calyx 1·5 mm. long, apparently reddish or purplish; lobes subulate. Corolla about 3 mm. long, white; standard pubescent on the back. Pods 10–14 mm. long, terete, pubescent with short spreading hairs.
TRANSVAAL. Barberton Distr.: Nelspruit, *Rogers* 23929 ! Type.

3. **I. relaxata** *N.E.Br.* sp. nov.—An annual, branching at the base into 4 or 5 (or more ?) ascending stems 20–25 cm. long and 1–1·2 mm. thick, terete, thinly sprinkled with closely adpressed hairs, green. Leaves 2–5 cm. long; leaflets 3–7, the lateral 10–15 mm. long, opposite in 1–3 pairs and the terminal one 12–30 mm. long, 1–2 mm. broad, linear, acute, thinly adpressed-pubescent on both sides. Racemes up to 2·5 cm. long, shorter than the leaves, bearing flowers nearly to the base; flowers rather lax. Pedicels 0·5 mm. long. Calyx about 2 mm. long; lobes subulate. Corolla 3·5–4 mm. long; standard adpressed-pubescent on the back, apparently dark violet-purple. Pods deflexed, 17–25 mm. long, 2·5 mm. broad, compressed, with a beaded midrib along each side (the beads do not correspond with the seeds), straight, with the tip slightly upcurved.
TRANSVAAL. Waterberg Distr.: Warmbaths, *Miss Leendertz* 2094 ! Type.

4. **I. Holubii** *N.E.Br.* sp. nov.—An annual, 10–15 cm. high or perhaps taller, branching at the top of the root; stems 1 mm. or less thick, green, sprinkled with adpressed centrally-fixed hairs. Leaves 2–4 cm. long; leaflets 5, the lateral opposite in 2 pairs, 8–15 mm. long, 3–5 mm. broad, flat elliptic-oblong, obtuse or rounded at the apex, obtuse or subacute at the base, adpressed-pubescent on both surfaces, but the hairs on the upper side often scanty and easily overlooked, so that it may appear glabrous. Racemes 1·5–4·5 cm. long, longer or shorter than the leaves, many-flowered; peduncle slender, thinly adpressed-pubescent, with the part below the lowest scar of fallen flowers 1–2 cm. long. Pedicels 0·5 mm. long. Calyx-lobes 2·5–3 mm. long, subulate. Corolla 5–6 mm. long, pink ?; standard rather inconspicuously adpressed-pubescent on the back. Pods 8–13 mm. long, deflexed, nearly straight or slightly curved, compressed, with the seeds bulging in bead-like prominences along each side, thinly adpressed-pubescent, pallid.
TRANSVAAL. In Banquaketse Territory and in Marico District, *Holub* ! Type.

5. **I. enormis** *N.E.Br.* sp. nov.—A shrublet 20–30 cm. high, woody at the base, with the young branchlets of dried specimens angular or grooved; young parts canescent with fine adpressed hairs, and the apical edges of the leaflets and underside of their midribs and the petiole thinly sprinkled with

stalked glands on some of the leaves, while on others they are quite absent. Leaves 10–15 mm. long ; leaflets 5–9, the lateral opposite in 2–4 pairs, 3–6 mm. long, 2–3·5 mm. broad, cuneate-obovate, broadly rounded and conspicuously apiculate at the apex, adpressed-pubescent on both sides. Racemes 1·5–4 cm. long, equalling or up to three times as long as the leaves. Calyx-lobes 2·5 mm. long. Corolla 6–7 mm. long, purple ; standard adpressed-pubescent on the back. Pods about 1 cm. long, compressed-terete.
Transvaal. Waterberg Distr. : near Potgietersrust, *Miss Leendertz* 1948 ! Type.

6. **I. rudis** *N.E.Br.* sp. nov.—A woody branching shrub, probably 60–100 cm. high, with stems or branches 3 mm. or more thick, brown and glabrous on the older, whitish-grey and setose on the younger woody parts. Leaves 10–25 mm. long ; leaflets 5–13, the lateral opposite in 2– (usually 4–) 6 pairs, 2–7 mm. long, 0·75–2 mm. broad, adpressed-pubescent on both sides and often glandular. Racemes 2–9 cm. long, two to several times as long as the leaves. Calyx-lobes variable 1·5–2 mm. long. Corolla 1 cm. long, purple ; standard thinly pubescent on the back. Young pods acutely pointed, pubescent.
Transvaal. Zoutpansberg Distr. : Messina, 2000 ft. alt., *Rogers* 19485 ! Type.
This differs from *I. heterotricha* DC. by its taller habit and woody stems, which do not die down to the ground in winter.

7. **I. lydenburgensis** *N.E.Br.* sp. nov.—Shrubby, woody below, apparently less than 40 cm. high, with a fine more or less canescent adpressed pubescence on the young stems and leaves, and with minute stalked glands on the racemes and often on the stems and petioles. Leaves 10–15 mm. long ; leaflets 3–7, the lateral opposite in 1–3 pairs, 4–7 mm. long, 1·5–2 mm. broad, cuneate-oblong or narrowly cuneate-obovate, the apex with a short recurved point but not conspicuously apiculate, thinly adpressed-pubescent on both sides. Racemes 4–9 cm. long, 4–5 times as long as the leaves, with the peduncle below the lowest scar of fallen flowers shorter than or about as long as the leaves. Pedicels about 0·5 mm. long. Calyx-lobes 1·5–2 mm. long. Corolla 5–6 mm. long ; standard pubescent with whitish adpressed hairs on the back. Pods 10–15 mm. long, adpressed-pubescent with white hairs.
Transvaal. Lydenburg Distr. : near Lydenburg, *Wilms* 310 ! Type.

8. **I. placida** *N.E.Br.* sp. nov.—A shrub or shrublet with dark brown branches, thinly adpressed-pubescent when young, becoming glabrous. Leaves 1·5–2·5 cm. long ; leaflets 7–11, the lateral opposite in 3–5 pairs, 5–10 mm. long, 2·5–4 mm. broad, oblong to elliptic, obtuse, apiculate, flat, glabrous above, thinly adpressed-pubescent beneath, drying blackish. Racemes 2–5 cm. long, longer than the leaves, slender, 12–24-flowered

with the peduncle below the lowest scar of fallen flowers 2–2·5 cm. long. Pedicels 2·5–3 mm. long. Calyx 1·5 mm. long. Corolla 4 mm. long, purple. Pods unknown.
TRANSVAAL. Ermelo Distr. : Spitzkop, *Mrs. Pott* 5083 ! Type.

9. **I. ingrata** *N.E.Br.* sp. nov.—Perennial ; stems numerous, 15–30 cm. (or more ?) high, 1·5–2 mm. thick, terete, sometimes adpressed-pubescent, sometimes somewhat tomentose with short spreading basifixed hairs, green, becoming brownish-grey below. Leaves 1·5–4 cm. long ; leaflets 7–11, the lateral opposite in 3–5 pairs, 5–9 mm. long, 4–6 mm. broad, elliptic or somewhat obovate, varying from obtusely rounded to distinctly notched at the apex, pubescent on both sides, without gland-tufts in their axils. Racemes 1·5–5 cm. long, usually longer than the leaves, with the peduncle below the lowest scar of fallen flowers 5–15 mm. long, and much shorter than the petiolar axis, several-flowered, with the buds in a rather compact head, but as the flowers expand, becoming somewhat lax-flowered. Calyx-lobes 2 mm. long, filiform. Corolla 6–7 mm. long, apparently purple ; standard pubescent on the back. Pods deflexed, 2 cm. long, 1·5 mm. thick, terete, straight, shortly and harshly subtomentose, pallid.
TRANSVAAL. Zoutpansberg Distr. : Liliput, 1950 ft. alt., *Rogers* 22535 ! Type.

10. **I. crebra** *N.E.Br.* sp. nov.—Perennial. Stems erect, 18–35 cm. high, 3–4 mm. thick below, more or less grooved, with an adpressed whitish pubescence on the upper part, and more or less beset with short spreading setae on the lower part. Leaves rather crowded, ascending and somewhat overlapping, 1·5–2 cm. long ; leaflets 3–5, the lateral opposite, 10–16 mm. long, 3–6 mm. broad, lanceolate, acute, with a short awn-like point, obtuse or cuneate at the base, adpressed-pubescent on both sides, and with the margins at the apical part and often the midrib beneath scabrid with minute points or setae. Racemes shorter than or about equalling the leaves, 1–1·5 cm. long, 4–10-flowered. Calyx-lobes 3·5–4 mm. long, subulate. Corolla about 5 mm. long ; standard adpressed-pubescent on the back.
SWAZILAND. Hlatikulu, *Stewart* 26 ! Type.

11. **I. tristoides** *N.E.Br.* sp. nov.—Perennial. Stems erect, up to 70 cm. high and 4 mm. thick, adpressed-pubescent, greyish brown or perhaps purplish. Leaves 2·5–4 cm. long ; leaflets 5–15, the lateral opposite in 2–7 pairs, 8–15 mm. long, 1·5–(usually 3-) 5 mm. broad, narrowly oblong or cuneately oblong, obtuse or rounded at the apex or rarely subacute or more or less truncate with the corners rounded, apiculate, finely adpressed-pubescent on both surfaces. Racemes 2–5 cm. long, varying from about as long as to twice as long as the leaves, with the peduncle below the lowest scar of fallen flowers 5–15 mm. long, and always shorter than the leaves and often shorter than the

petiolar axis. Pedicels 3–7 mm. long. Calyx not more than one-quarter of the length of the corolla, with deltoid lobes 1–2 mm. long. Corolla 10–16 mm. long ; standard adpressed-pubescent with brown hairs on the back. Pods drooping, 3–4 cm. long, 3 mm. thick, terete, straight, adpressed-pubescent with very minute white and dark brown hairs intermingled.

Transvaal. Lydenburg Distr. : by the river near Lydenburg, *Wilms* 322 ! Type.

This species is closely allied to *I. tristis* E. Mey., but constantly differs by its less lax appearance, by the racemes not being more than about twice as long as the leaves instead of 3–4–times as long as them, and particularly by the peduncle below the lowest scar of fallen flowers being shorter than the leaves, instead of longer than them, as they are in *I. tristis* and by the fully developed corolla in bud measuring 4–5 mm. across the folded standard and keel, while in *I. tristis* it measures only 3 mm.

12. **I. dissimilis** *N.E.Br.* sp. nov.—Apparently perennial. Stems 25–35 cm. high, 1·2–1·5 mm. thick below, erect, branching, terete, purple or violaceous, somewhat thinly adpressed-pubescent with centrally fixed white hairs ; branches ascending-spreading. Leaves 2–3·5 cm. long ; leaflets 11–17, the lateral opposite in 5–8 pairs, with the lowest pair close to the stem, 5–11 mm. long, 1·5–3 mm. broad, oblong, obtuse, sprinkled with fine loose outstanding hairs on the upper surface and adpressed-pubescent with centrally fixed coarser hairs on the under surface, both sides green. Racemes 4·5–8 cm. long, 2–3 times as long as the leaves, slender, laxly several-flowered, with the peduncle below the lowest scar of fallen flowers 15–30 mm. long and longer than the petiolar axis. Pedicels 2–3 mm. long. Calyx 1·5 mm. long ; lobes subulate. Corolla 4 mm. long, apparently pink or purple ; standard adpressed-pubescent with brown hairs on the back. Pods spreading, 17–25 mm. long, terete, brown, thinly adpressed-pubescent.

Transvaal. Barberton Distr. ? precise locality unknown, " probably from Barberton ", *Rogers* 23923 bis ! Type.

The very different character of the hairs on the two surfaces of the leaflets readily distinguishes this from every other species known from the Transvaal.

13. **I. compacta** *N.E.Br.* sp. nov.—Stems several or many from a perennial rootstock, erect, 10–30 cm. high, 1·5–2 mm. thick, more or less tomentose or with a loose (not adpressed) pubescence. Leaves ascending and more or less overlapping, 1·5–3 cm. long ; leaflets 3–9, the lateral opposite in 1–4 pairs, 9–17 mm. long, 2·5–5 mm. broad, lanceolate to oblong, mucronate or with short awn-like points, cuneate or rounded at the base, pubescent on both sides. Racemes 2·5–4·5 cm. long, mostly exceeding the leaves, erect or ascending, and together with the leaves more or less crowded into an irregular mass up

to 4 cm. in diameter, pubescent like the stems. Calyx-lobes 5–6 mm. long, subulate. Corolla 7–10 mm. long; standard pubescent with whitish hairs on the back.

TRANSVAAL. Barberton Distr.: Abbots Hill, near Barberton, 3500 ft. alt., *Galpin* 1039 ! Type.

Closely allied to *I. hilaris* E. and Z., and possibly a hybrid between that and some other species. It differs by its more robust habit, more spreading pubescence and larger flowers.

14. **I. hybrida** *N.E.Br.* sp. nov.—Stems several from a perennial rootstock, herbaceous, 30–40 cm. high, brown, minutely adpressed-pubescent and rough from minute stalked glands, which are occasionally nearly absent. Leaves 1·5–3 cm. long; leaflets 3–11 (mostly 7–9), the lateral opposite in 1–4 pairs, 10–15 mm. long, 2–3·5 mm. broad, linear-cuneate, mucronate, folded, adpressed-pubescent on both sides and often glandular at the apex on the edges and on the midrib beneath. Racemes 2–8 cm. long equalling to much longer than the leaves, with the peduncle below the lowest scar of fallen flowers shorter than the leaves. Pedicels 1·5–2 mm. long. Calyx-lobes 3·5–5 mm. long, more than half as long as the corolla, subulate, glandular. Corolla 6 mm. long, purple; standard pubescent with whitish hairs on the back.

TRANSVAAL. Ermelo Distr.: Spitzkop, *Mrs. Pott* 5079 ! Type.

This is very similar to *I. hilaris* E. and Z. in general appearance, although readily distinguished by the presence of stalked glands upon its stems and leaflets. It is probably a hybrid between *I. hilaris* and one of the species having gland-tipped setae.

15. **I. densa** *N.E.Br.* sp. nov.—Stems many from a woody rootstock up to 15 cm. high, erect, simple or branched, 1–1·5 mm. thick, angular, adpressed-pubescent, brownish. Leaves 1·5–2 cm. long; leaflets 5–9, the lateral opposite in 2–4 pairs, 8–12 mm. long, 1·5–2 mm. broad, oblong-linear, obtuse, minutely apiculate, often folded, glabrous above. Axis of the racemes up to 1 cm. long, shorter than the leaves, few-flowered. Calyx not a quarter of the length of the corolla, with lobes 1–1·5 mm. long, deltoid or deltoid-subulate. Corolla 10–11 mm. long; standard shorter than the keel, densely adpressed-pubescent with whitish hairs on the back, and apparently paler in colour than the purple keel.

TRANSVAAL. Barberton Distr.: near Barberton, *Thorncroft* ! Type.

Allied to *I. hilaris* E. and Z. but readily distinguished by its dwarf habit, much smaller calyx and much larger corolla.

16. **I. commixta** *N.E.Br.* sp. nov.—Perennial. Stems numerous, 12–25 cm. high, or perhaps more 0·6–1·7 mm. thick at the base, terete or slightly angular, brown, except at the tips, softly pubescent with very short spreading hairs. Leaves 2–4 cm. long; leaflets 11–15, the lateral opposite in 5–6 pairs,

5–10 mm. long, 3–5 mm. broad, oblong or elliptic-oblong, rounded at both ends, apiculate, usually folded, somewhat adpressed-pubescent on both sides and with blackish or dark brown tufts of minute glands in their axils. Racemes 1·5–4 cm. long, usually shorter than the leaves, somewhat laxly several-flowered. Pedicels about 1 mm. long. Calyx-lobes 2 mm. long. Corolla 5 mm. long ; standard pubescent on the back with somewhat spreading hairs. Pods short, spreading, 6–10 mm. long, 2·5 mm. thick, terete, dark brown, pubescent with short spreading whitish hairs.

Transvaal. Bloemhof Distr. : on the top of a kopje on the farm " Kaffraria ", near Christiana, *Burtt Davy* 13228 ! Type.

17. **I. comosa** *N.E.Br.* sp. nov.—A dwarf shrublet with decumbent stems and branches up to 40 cm. or more long and 2–5 mm. thick, woody, with a short spreading pubescence on the young parts. Leaves 1·5–5 cm. long, drying green ; leaflets 9–21, the lateral opposite in 4–10 pairs, 3–10 mm. long, 2–5 mm. broad, elliptic or elliptic-oblong, rounded at both ends, often folded, glabrous on the upper surface, finely pubescent beneath, and with tufts of minute blackish glands in their axils. Racemes 2–7 cm. long, longer than the leaves, but with the peduncle below the lowest scar of fallen flowers much shorter than the leaves, pubescent with short spreading hairs. Bracts 4–6 mm. long, conspicuously longer than the young flower-buds, filiform-subulate. Pedicels scarcely 0·5 mm. long. Calyx 3–5 mm. long, with filiform lobes. Corolla 5–6 mm. long, distinctly longer than the calyx, " brick-red " ; standard pubescent on the back with whitish hairs. Pods 10–13 mm. long, 2·5 mm. thick, terete, acute, dark brown, pubescent with short spreading hairs.

Transvaal. Pretoria Distr. : near Pretoria, *Rehmann* 4397 ! Type ; *Kirk* 14 !

This is closely allied to *I. malacostachys* Benth (syn. *I. melanadenia* Benth.), but differs from that species by its spreading not adpressed pubescence on the stem etc., by the upper surface of the leaflets being glabrous, by the bracts being conspicuously longer than the young buds, by the larger corolla which is distinctly longer than the calyx, and the much longer pods.

18. **I. accepta** *N.E.Br.* sp. nov.—Perennial. Stems about 25 cm. high, 1·5–1·75 mm. thick below, unbranched, adpressed-pubescent with black and white hairs intermingled. Leaves 3–4·5 cm. long ; leaflets 5–11, the lateral opposite in 2–5 pairs, 10–20 mm. long, 3–5 mm. broad, narrowly oblong, obtuse, usually folded, adpressed-pubescent and equally green on both sides ; petiole clothed with adpressed black or black and white hairs intermingled and often the leaflets have some black hairs on their edges and on the midrib beneath. Racemes (not fully developed) 5–9 cm. long, probably about 2·5–3 times as long as

the leaves, with the flowers when in bud in a dense spike, clothed with black and white hairs intermingled, and with the peduncle below the lowest scar of fallen flowers 2·5–4 cm. long and as long as or longer than the leaves. Pedicels about 0·5 mm. long, or flowers subsessile. Calyx about 5 mm. long; lobes subulate. Corolla not or scarcely longer than the calyx, 5 mm. long, apparently pink or purple; standard adpressed-pubescent on the back with whitish hairs. Pods not seen.
TRANSVAAL. Pietersburg Distr.: the Downs, *Rogers* 21995 ! Type.

19. **I. Nelsonii** *N.E.Br.* sp. nov.—Stems several from a woody rootstock, probably decumbent, terete, softly tomentose. Leaves 3–7·5 cm. long; leaflets 7–21, the lateral opposite in 3–10 pairs, 6–12 mm. long, 3·5–6 mm. broad, elliptic, rounded at both ends or rarely cuneate at the base, minutely apiculate, adpressed-pubescent or tomentose on both surfaces and with black gland-tufts in their axils. Racemes 4–10 cm. long, exceeding the leaves, with a dense tomentose spike of purple or red flowers. Corolla 12–14 mm. long; keel 3·5–4 mm. deep. Pods spreading, 12–15 mm. long, stout, terete, softly tomentose.
TRANSVAAL. Waterberg Distr.: the Nylstroom, at Sandfontein, *Nelson* 292 ! Type.

This closely resembles *I. oxytropis* Benth., but so conspicuously differs from that species by the dense silky-tomentose upper surface of the leaflets that I cannot think it is a mere variety of it.

20. **I. pongolana** *N.E.Br.* sp. nov.—Stems up to 35 cm. or perhaps more in length, probably decumbent, 1·5–2 mm. thick, slightly compressed-terete, branching, with a closely adpressed silky pubescence and a sprinkling of loose hairs on the green part. Leaves 1·5–5·5 cm. long; leaflets 5–11, the lateral opposite in 2–5 pairs, 6–18 mm. long, 2–4·5 mm. broad, narrowly oblong or lanceolate, subacute or obtuse, apiculate, adpressed-pubescent on both sides, and with black or brown tufts of minute glands in their axils. Racemes 7–10 cm. long, much longer than the leaves, somewhat laxly many-flowered. Calyx-lobes 5–6 mm. long, subulate. Corolla 12–14 mm. long, purple; keel 2–2·5 mm. deep; standard with a white adpressed silky pubescence on the back.
TRANSVAAL. Waterberg Distr.: in the drainage basin of the Pongola River, *Burtt Davy* 18235 ! Type.

21. **I. perplexa** *N.E.Br.* sp. nov.—Stems 50 cm. or more high, 4 mm. thick below, branching at the upper part, terete, subtomentose on the younger parts and on the petioles with widely spreading rust-coloured hairs. Leaves 6–9 cm. long; leaflets 7–15, the lateral opposite, 15–25 mm. long, 6–12 mm. broad, elliptic-oblong, obtuse or rounded at both ends, finely adpressed-pubescent on both sides, without gland-tufts in their axils, but with stipels 1–2 mm. long. Racemes 3·5–8 cm. long,

not longer than the leaves, laxly many-flowered, with the flowers in distant clusters of 2–3, and peduncle below the lowest scar of fallen flowers 1·5–3 cm. long, 0·5–0·6 mm. thick, pubescent. Bracts not exceeding the calyx-lobes, about 2 mm. long. Calyx-lobes 1 mm. long, deltoid, acute. Corolla 5 mm. long ; standard densely adpressed-pubescent with brown hairs. Stamens 3–3·5 mm. long. Pod unknown.
TRANSVAAL. Pietersburg Distr. : Shilouvane, *Junod !* Type.

22. **I. subincana** *N.E.Br.* sp. nov.—Stems erect from a perennial rootstock, 30–60 cm. high, 1·25–2 mm. thick, angular above, terete below, densely covered with a fine whitish adpressed pubescence. Leaves 2·5–4 cm. long ; leaflets 3, the lateral opposite, seated at about the middle of the petiolar axis, 12–30 mm. long, 3–9 mm. broad, oblong or oblong-lanceolate, obtuse, flat, thinly adpressed-pubescent on both sides. Racemes 4–5 cm. long, about as long as or a little longer than the leaves, whitish-pubescent. Pedicels about 1 mm. long or less, recurved after flowering. Calyx lobes 2 mm. long. Corolla 3–4 mm. long ; standard adpressed-pubescent on the back. Pods deflexed and curved outwards, 3 cm. (or more ?) long, somewhat 4-angled, adpressed-pubescent.
TRANSVAAL. Zoutpansberg Distr. : Messina, 2000 ft. alt., *Rogers* 22560 ! Type.

23. **I. brevifolia** *N.E.Br.* sp. nov.—Perennial, apparently prostrate or diffuse, much branched, the main stems 1–1·5 mm. thick, branches more slender, scantily adpressed-pubescent, brown. Leaves very small, 8–10 mm. long ; leaflets 3–5 mm. long, 1–2 mm. broad, the lateral opposite, in 3–4 pairs, oblong or cuneate-oblong ; obtuse, apiculate, glabrous above, thinly sprinkled with minute adpressed centrally fixed hairs beneath that require a strong lens to be made visible. Racemes 3–9 cm. long, slender, with the peduncle below the lowest scar of fallen flowers 3–5 times as long as the leaves, nearly glabrous. Flowers rather lax as they open, spreading or ascending-spreading. Pedicels 1·5–2 mm. long. Calyx lobes 1 mm. long, subulate. Corolla 6–7 mm. long ; standard densely adpressed-pubescent with brown hairs. Pods not seen.
TRANSVAAL. Lydenburg Distr. : Graskop, near Pilgrims Rest, *Burtt Davy* in Government Herbarium, Pretoria 1475 ! Type.

24. **I. pauxilla** *N.E.Br.* sp. nov.—Much branched from a woody base and apparently not more (perhaps less) than 10–15 cm. high ; branches 1–1·5 mm. thick, brown, thinly adpressed-pubescent or canescent. Leaves very small, 8–10 mm. long ; leaflets 7–13, the lateral opposite in 3–6 pairs, 3–5 mm. long, 1·5–2 mm. broad, cuneate-obovate or oblong-ovate, obtuse, minutely apiculate, folded, glabrous above, adpressed-pubescent beneath. Racemes 1–2 cm. long, up to about twice as long as the leaves with the peduncle below the lowest scar of fallen flowers 8–12 mm. long. Pedicels 1–1·5 mm. long. Calyx-

lobes 1 mm. long, deltoid-subulate. Corolla 4–5 mm. long; standard adpressed-pubescent on the back. Pod 15–18 mm. long, terete, dark brown, with paler sutures, thinly adpressed-pubescent.
TRANSVAAL. Lydenburg Distr.: near Lydenburg, *Wilms* 314 ! Type.

25. **I. obscura** *N.E.Br.* sp. nov.—Perennial. Stems numerous, erect, 15–30 cm. long, 1–1·25 mm. thick, arising from thicker basal stems, brown, thinly adpressed-pubescent, with internodes 3–10 mm. long. Leaves 10–15 mm. long; leaflets 5–7 (occasionally 3), the lateral opposite in 1–3 pairs, 4–8 mm. long, mostly 1·5–2 mm. broad, cuneately oblong, mostly folded, glabrous above thinly adpressed-pubescent beneath, with very fine hairs. Raceme-axis shorter than or equalling the leaves, 5–10 mm. long, slender, slightly flexuose, 2–6-flowered. Pedicels 2·5–3·5 mm. long in fruit. Calyx-lobes 2 mm. long, subulate. Corolla 4–5 mm. long, purple. Pods 10–18 mm. long, 2·5 mm. thick, terete, blackish with a conspicuous brown keel, thinly adpressed-pubescent.
TRANSVAAL. Ermelo Distr.: near Ermelo, *Miss Leendertz* 3121 ! Type.

This is very similar to some specimens of *I. Woodii* Bolus but conspicuously differs by its racemes being shorter than or only equalling the leaves, instead of being much longer than them, by its shorter pedicels and shorter and stouter pods.

When describing *I. Woodii* Dr. Bolus did not indicate any type for the species, but as the form he has called var. *laxa* is the only one quoted by Bolus that was collected by Dr. Wood, (after whom the species is named), that form should be considered as being the type. But I see no difference whatever between the Clydesdale plant (Herb. Aust. Afr. 1267) and the Inanda plant (*Wood* 974) as represented at Kew, although Bolus distinguished them as two forms (var. *intermedia* and var. *laxa*). *Wood* 781, quoted by Bolus as also being *I. Woodii* var. *laxa*, as represented at Kew is *I. tristis* E. Mey.!

With reference to *I. Woodii* var. *parvifolia* Bolus (Journ. of Bot. 1896, p. 24), founded upon *Tyson* 1758, from Mount Currie, this is not represented at Kew, but a Transvaal specimen I have seen so named is certainly distinct from *I. Woodii*, and I suspect, from the description, that the Mount Currie plant is also a perfectly distinct species.

26. **I. frondosa** *N.E.Br.* sp. nov.— Probably perennial. Stems more than 30 cm. high, 2–2·5 mm. thick, terete, ribbed, light brown, branching at or above the middle, leafy, thinly adpressed-pubescent with centrally fixed hairs. Leaves 15–25 mm. long, more or less recurving, drying blackish; leaflets 9–17, the lateral opposite in 4–8 pairs, 7–12 mm. long, 1·5–2 mm. broad, folded, linear or narrowly oblong-linear, subacute, apiculate, glabrous on the upper surface, thinly adpressed-

pubescent beneath. Racemes 2–3 cm. long, longer than and up to twice as long as the leaves, up to about 15–flowered, with the peduncle below the lowest scar of fallen flowers shorter or scarcely longer than the leaves, ascending-spreading, slender. Pedicels 3–4 mm. long. Calyx-lobes 1–1·5 mm. long. Corolla 10 mm. long, apparently purple ; standard and keel adpressed-pubescent on the back with fine brown hairs. Pods unknown. TRANSVAAL. Lydenburg Distr. : hills near Belfast, 6500 ft. alt., *Bolus* 11815 ! Type.

27. **I. Masonae** *N.E.Br.* sp. nov.—Perennial, erect, branching, 45–65 cm. or more high ; stems and branches straight, 1–2·5 mm. thick, angular above, very thinly sprinkled with adpressed hairs or subglabrous, probably green or greyish-green. Leaves 2–5 cm. long, with 3–5 linear leaflets, the lateral 8–15 mm. and the terminal one 15–30 mm. long, 1–3 mm. broad, thinly sprinkled with adpressed hairs on both sides or nearly glabrous. Racemes 4–9 cm. long, 3–15-flowered ; peduncle very slender 0·3 mm. thick, with the part below the lowest scar of fallen flowers usually longer than the leaves. Flowers ascending. Pedicels 4–6 mm. long. Calyx-lobes 1 mm. long. Corolla 7 mm. long ; standard pubescent with adpressed brown hairs on the back. Pods spreading or ascending, 3–4 cm. long, somewhat compressed-terete, acute, thinly adpressed-pubescent or sub-glabrous.
TRANSVAAL. Carolina Distr. : Waterval Boven, *Miss E. Mason* 29 ! Type.
This species is well distinguished by the terminal leaflet being very much longer than the others.

28. **I. lepida** *N.E.Br.* sp. nov.—Probably perennial. Stems erect, 40 cm. or more high, 1–1·5 mm. thick, terete, nearly glabrous or thinly sprinkled with minute centrally fixed adpressed hairs, pale brown. Leaves 15–30 mm. long, ascending ; leaflets 5–7, the lateral opposite in 2–3 pairs, 6–18 mm. long, 1–2 mm. broad, linear, glabrous above, thinly and inconspicuously adpressed-pubescent beneath. Racemes 7–14 cm. long and 4–7 times as long as the leaves, slender, with the peduncle below the lowest scar of fallen flowers much longer than the leaves. Flowers lax. Pedicels 3–5 mm. long, straight in young fruit. Calyx-lobes scarcely 1 mm. long. Corolla 6 mm. long, red ; standard adpressed-pubescent with brown hairs on the back. Pods linear-terete, seen only in a young state.
TRANSVAAL. Barberton Distr. : near Barberton, 3000 ft. alt., *Thorncroft* 266 ! Type.

29. **I. ripae** *N.E.Br.* sp. nov.—Stems erect, up to 60 cm. or more high, about 2 mm. thick below, angular, with the flattish spaces between the angles or ridges much broader than the ridges, finely adpressed-pubescent with minute centrally fixed hairs, canescent or greyish-brown. Leaves 10–35 mm. long, drying greenish or pallid ; leaflets 9–17, the lateral opposite

in 4–8 pairs, 5–11 mm. long, 1·5–2 mm. broad, linear-oblong, obtuse, apiculate, longitudinally folded, minutely adpressed-pubescent on both surfaces. Racemes 4–8 cm. long and 4–6 times as long as the flowering leaves, slender, with the peduncle below the lowest scar of fallen flowers longer than the leaves. Flowers lax, ascending in bud, spreading when open. Pedicels 2–4 mm. long. Calyx-lobes scarcely 1 mm. long, deltoid. Corolla 10 mm. long; standard as seen in bud adpressed-pubescent with somewhat golden-brown hairs. Pods very young, apparently terete.
TRANSVAAL. Lydenburg Distr.: banks of river near Lydenburg, *Wilms* 301 ! Type.

30. **I. amitina** *N.E.Br.* sp. nov.—Stems (or perhaps branches from a shrub) erect, 40 cm. or more long, 2 mm. thick below, branching, the younger branches slightly angular, somewhat greyish-green or brownish (perhaps purplish when alive), adpressed-pubescent with minute whitish centrally fixed hairs. Leaves 1·5–3 cm. long; leaflets 9–13, the lateral opposite in 4–6 pairs, 5–11 mm. long, 1–4 mm. broad, oblong or cuneate-oblong, obtuse, apiculate, finely and minutely adpressed-pubescent on both sides, drying fuscous. Racemes 3–9 cm. long, the longer 3–4 times as long as the leaves, with the peduncle below the lowest scar of fallen flowers as long as or longer than the leaves, very slender, less than 0·5 mm. thick, up to 30-flowered. Flowers lax. Pedicels 2–3·5 mm. long. Calyx about 1 mm. long; lobes deltoid, acute. Corolla about 5 mm. long, shortly and acutely pointed in mature bud; standard adpressed-pubescent with brown hairs on the back. Very young pods more or less curved, with a much curved style conspicuously thickened at the basal half; mature pods not seen.
TRANSVAAL. Carolina Distr.: near Waterval Boven, *Rogers* 14440 ! Type.

31. **I. Galpinii** *N.E.Br.* sp. nov.—Stems (or possibly branches from a shrub) over 40 cm. long, slender, 1–2 mm. thick, probably erect, more or less branching, slightly angular when young, becoming terete and smooth, adpressed-pubescent with minute whitish centrally fixed hairs, green, becoming greyish or brown with age. Leaves 2·5–4 cm. long; leaflets 5–9, the lateral opposite in 2–3 pairs, 8–15 mm. long, 2–4 mm. broad, flat, oblong or oblong-lanceolate, obtuse, apiculate, thinly adpressed-pubescent and equally green on both surfaces. Racemes 6–10 cm. long, 2–3 times as long as the leaves, very slender, laxly several-flowered, with the peduncle below the lowest scar of fallen flowers 2–3·5 cm. long and shorter than the leaf but longer than the petiolar axis. Pedicels 2·5–4 mm. long. Calyx about 1·5 mm. long, with deltoid lobes 0·5–1 mm. long. Corolla 5–6 mm. long, pink, obtuse in bud; standard adpressed-pubescent with brown hairs on the back. Pods

20–22 mm. long, straight, spreading or slightly drooping, brown, adpressed-pubescent.
TRANSVAAL. Barberton Distr. : Berea Ridge, near Barberton, 3000 ft. alt., *Galpin* 1299 ! Type.

32. **I. floribunda** *N.E.Br.* sp. nov.—Apparently perennial. Stems erect, over 40 cm. high, 3–4 mm. thick, with some short weak ascending branches at the middle or upper part, thinly adpressed-pubescent with very minute centrally fixed hairs, dark brown. Leaves 13–30 mm. long ; leaflets 5–9, the lateral opposite in 2–4 pairs, 7–14 mm. long, 4–9 mm. broad, flat, elliptic or obovate, obtusely rounded at the apex, apiculate, glabrous above, and often appearing glabrous on the under-surface, but usually (under a strong lens) found to be thinly sprinkled with minute scattered adpressed hairs. Racemes 5–11 cm. long, usually 3–4·5 times as long as the leaves, with the peduncle below the lowest scar of fallen flowers much longer than the leaves. Pedicels 2–4 mm. long. Calyx-lobes 1·5–2 mm. long. Corolla 5 mm. long, apparently pink or purple ; standard adpressed-pubescent with brown hairs on the back. Pods not seen.
TRANSVAAL. Lydenburg District : At Mac-a-Mac, *Mudd* ! Type.

XIX.—MISCELLANEOUS NOTES.

Wallich's Catalogue and G. Don's General System.—Under the International Rules of Nomenclature (Art. 37) the numerous names of new species contained in Wallich's Numerical List (1828–49), better known as Wallich's Catalogue, were invalid owing to the absence of descriptions. Many of them were subsequently validated, however, by the publication of descriptions by various authors. In the Index Kewensis these names were, for the most part, cited merely from Wallich's Catalogue, so that they appeared as *nomina nuda*.

During the preparation of the sixth Supplement of the Index Kewensis for the press it was noticed that certain species of *Nauclea* cited in the original Index merely from Wall. Cat. had been described in George Don's General System (1831–37), and on further investigation the same was found to be true of many other species belonging to various families. Some of the *nomina nuda* contained in Roxburgh's Hortus Bengalensis (1814) are in the same case. A list of all the species described for the first time in the General System, and not hitherto cited from that work in the Index Kewensis, is accordingly being prepared for inclusion in the seventh Supplement of the Index. T. A. S.

South African Ecology*.—In his recent work on South African vegetation Prof. Bews has provided a distinct contribution

* Plant Forms and their Evolution in South Africa, J. W. Bews, pp. 199, ill. 31, and map. Longmans, Green and Co., London, 1925. Price 12s. 6d.

to our records of that part of Africa. He introduces his subject by a discussion on the general physiographic and climatic factors that influence plant life in South Africa and outlines the main floral elements and types of vegetation. He then proceeds to a general review of the theories on the evolution of plant forms, finally considering as a special case the origin and migrations of the South African flora. Chapters iv to viii are devoted to a critical examination of the main types of the vegetation, their characteristic factors and chief subtypes. The floras of the Karroo, the Mountain, and South-West Cape are dealt with in separate chapters. In the final chapter Prof. Bews summarises the theories he has advanced throughout the book, and a useful bibliography on South African ecology is included.

The illustrations, apart from the map, are drawings of characteristic species, and it is to be regretted that Prof. Bews did not include photographs of the types of vegetation he describes. These would have been particularly useful to illustrate his descriptions of such terms as Tree-Veld, Grass-Veld, Sand-Veld, Savannah forest and Scrub, which are used with varying significance by different authors. General readers also are not necessarily familiar with such words as vleis, Fynbosch and opslag. These, however, are small matters in connection with a work that should appeal not only to students of the South African flora but to plant ecologists generally.

Manual of Tree and Shrub Insects *.—This book is one of the "Rural Manuals" under the editorship of Mr. L. H. Bailey. It deals very exhaustively with the insects which attack trees and shrubs in North America, and, as many of these insects are common in Europe, the book will be found to be useful to foresters and gardeners in this country as well as in America. The author begins with a chapter on general information concerning insects, and follows with a chapter on natural checks and methods of control for injurious insects. He then describes the various moths, plant lice, scale insects, beetles, flies, &c., which have come under his notice. In his descriptions of the various species he gives common and scientific names, distinguishing characters, habits, and the best known methods of control. Many of the descriptions are accompanied by excellent illustrations. A mistake appears to have been made on p. 229 where Fig. 131 is described as "Pales Weevil," the figure being identical with Fig. 186, p. 304, where the beetle appears to be correctly described as *Chrysobothris dentipes*. Apart from this the book appears to be singularly free from errors. Both type and illustrations are good. The work comprises 382 pages with 256 illustrations and a good index. W. D.

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* Manual of Tree and Shrub Insects, by Ephraim Porter Felt. Macmillan and Co., Ltd., London and New York. Price 16s. net.

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